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LESIONS PECULIAR TO THE PANCREAS AND THEIR CLINICAL ASPECT.[1]

BY EUGENE L. OPIE, M.D.,
OF BALTIMORE, MD.

To the clinician the characteristic feature of pancreatic disease is doubtless the obscurity of its symptoms. Though the gland is one of the most important organs of the body, subserving a considerable variety of diverse functions, extensive destructive changes are often unaccompanied by recognizable symptoms. This obscurity is due to a variety of causes. The organ is situated in contact with the vertebral column and unlike the liver is rarely palpable either in health or disease. The secretion elaborated by the pancreas plays an important part in the digestion of proteids, fats and carbohydrates, yet only when the pancreatic juice is wholly or almost wholly prevented from reaching the intestine does the resulting disturbance of digestion give indication of pancreatic disease. Occlusion of the bile duct causes the accumulation of bile in the tissues and its excretion in the urine, but occlusion of the pancreatic duct causes neither the accumulation nor excretion of any product which is so readily recognized as the bile pigments. Grave lesions of the pancreas are accompanied by the disorder of carbohydrate metabolism, diabetes mellitus, but the diagnostic value of glycosuria is modified on the one hand by the occurrence of diabetes without disease of the pancreas, and on the other hand by the absence of diabetes with many lesions of the gland.

Recognition of pancreatic disease is further complicated by the fact that lesions of the gland are seldom primary, but are dependent upon changes in other organs, notably in the duodenum, liver or bile passages. Nevertheless, the knowledge that certain lesions of the pancreas are frequently found in association with more readily recognizable conditions will in many instances give evidence that the gland is diseased. An understanding of the peculiar pathology of the pancreas and of its relation to that of other organs is therefore essential to the diagnosis of pancreatic disease.

The pancreas, unlike all other glandular organs, consists of two elements which differ so much in structure and function that it is necessary to consider separately the diseases which affect them. Secreting cells which elaborate the ferments of the pancreatic juice are in communication with a system of ducts carrying the products of secretion to the duodenum. Embedded among the secreting acini are small round bodies which can barely be recognized by the naked eye. The cells which form such bodies, differ from those of the secreting acini; they do not communicate with the ducts, and take no part in the manufacture of the pancreatic juice. They are, however, in intimate contact with dilated capillary vessels, and abundant evidence has shown that through the medium of the blood they exert an important influence upon metabolism. These structures which resemble certain other ductless glands, the parathyroid bodies, the adrenals and the thyroid gland, are the so-called islands of Langerhans.

Diseases of the pancreas, therefore, may be conveniently separated as follows: fiirst, those which affect the secreting apparatus of the gland and, second, those which have their seat in the islands of Langerhans and interfere with the influence which these structures exert on carbohydrate metabolism.

Before considering those lesions which affect the secreting apparatus of the gland I will mention certain recently demonstrated facts concerning the physiology of the pancreatic juice, the so-called external secretion of the organ. Even though their bearing upon clinical medicine and upon pathology may not as yet be evident they serve to show the complexity of the pancreatic functions.

Most important are the observations of Pawlow and his pupils. The pancreatic juice contains three ferments which have a preeminent part in the digestion of the three most important constituents of the food. In the cells of the pancreas the precursors of these ferments exist as zymogens, so that an extract made from fresh pancreatic tissue is capable of digesting proteid only after the contained zymogen has been converted into trypsin. Pancreatic juice obtained from a pancreatic fistula in the dog is capable of only weak solvent action upon proteid material. Schepowalnikow, a pupil of Pawlow, has shown that the intestinal secretion, the succus entericus, to which heretofore little significance has been accorded contains a ferment which acting upon the pancreatic juice enormously increases its power to digest proteid substances, such as fibrin or coagulated egg albumin. Pawlow believes that the proteid-digesting ferment of the pancreatic juice is excreted in the form of inactive zymogen which is converted into active trypsin by the action of a second ferment contained in the succus entericus of the duodenum. To this ferment of a ferment, as he describes it, he has given the name enterokinase.

Enterokinase, moreover, exerts an augmenting action upon the fat-splitting ferment of the pancreatic juice, but here comes into play a second

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factor which has an important bearing upon the etiology of acute hemorrhagic pancreatitis and the associated fat necrosis. Bruno another pupil of Pawlow has emphasized the fact, already known, that the bile affords a favorable medium for the action of the pancreatic ferments and particularly of the fat-splitting ferment, which may be increased in efficiency two or threefold. This favoring action of the bile is due to its chemical constitution and not to a ferment like enterokinase. Pawlow and his pupils have clearly demonstrated the important fact that the activity of the pancreatic juice is in considerable part dependent upon the secretions with which it comes in contact after it has entered the intestine.

A consideration of pancreatic disease may well be introduced by a few remarks concerning the effect of pancreatic juice diverted from its proper channels into the tissues about the organ. When the common bile duct is occluded, bile is dammed back upon the liver and is transported to all parts of the body. Jaundice is readily recognizable because bile pigments are present in the conjunctiva and in the skin, while the characteristic color and certain chemical reactions readily establish their presence in the urine. When, however, the secretion of the pancreas is diverted from its normal channel, no pigmented constituent gives evidence of its presence in the tissues, nor have we, as yet, any certain means of demonstrating the presence in the urine of substances formed in the pancreas.

Nevertheless, pancreatic secretion which has found its way into the tissues causes a characteristic lesion, but since this lesion is usually confined to the adipose tissue of the abdominal cavity it has diagnostic significance only to the surgeon who opens the abdomen. I refer to the so-called fat necrosis which occurs only in association with disease of the pancreas. Circumscribed opaque white foci of necrosis are conspicuous upon the translucent yellow fat of the omentum, of the mesentery, and below the parietal peritoneum, and are recognizable as soon as the peritoneal cavity is opened. In the neighborhood of the pancreas necrotic areas are large and often confluent. In cases where the lesion is recognized examination of the organ at operation reveals one of a variety of changes. Acute hemorrhagic pancreatitis is most frequently associated with fat necrosis; suppurative pancreatitis is less commonly found accompanying it. Fat necrosis may accompany chronic interstitial pancreatitis, or obstruction of the pancreatic duct caused by biliary or pancreatic calculi, or by carcinoma compressing the duct. In order to explain the relation of fat necrosis to these various lesions it is necessary to briefly describe its pathogenesis.

Langerhans showed that death of the fat cells is associated with the splitting of their contained fat into glycerin, which being soluble is carried away, and insoluble fatty acids, which remaining are recognizable within the dead fat cells. Flexner was able to demonstrate in the foci of necrosis a fat-splitting ferment which is doubtless identical with that of the pancreatic juice. That necrosis of fat is in reality caused by the penetration of pancreatic juice into the tissues is well illustrated by the following experiment: When in the cat both ducts of the pancreas are securely ligated, death with necrosis of almost the entire abdominal fat results within several weeks, being caused presumably by pancreatic juice which is dammed back upon the gland. If after the ducts are ligated pilocarpine, which stimulates the pancreatic secretion, is administered to the animal, fat necrosis of the same extent results within several days. Moreover, those lesions of the pancreas which cause fat necrosis are such as favor the penetration of the pancreatic ferments into the tissues about the pancreas.

Fat necrosis for the surgeon may often serve as an index to pancreatic disease and recognized during the course of an exploratory laparotomy has not infrequently explained an otherwise wholly obscure case. In the majority of instances fat necrosis implicating the omentum, the mesentery and perhaps the fat of the parietal peritoneum, is caused by the condition known as acute hemorrhagic pancreatitis.

Acute hemorrhagic pancreatitis primarily affects the secreting apparatus of the pancreas and is doubtless in all instances dependent for its origin upon the peculiar anatomical and physiological characters of the gland. The disease is uncommon, but of such severity that death may result within forty-eight hours after the onset of symptoms. In the more typical cases an individual, often in good health, who perhaps has suffered with previous attack of abdominal pain is suddenly seized with intense pain in the epigastrium, soon accompanied by uncontrollable vomiting, and followed by very profound collapse. The localization of the pain and the severity of the symptoms are the most characteristic features of the disease and in a certain number of cases make a diagnosis possible. Not infrequently the symptoms, though of the same character, are less severe, the individual survives several weeks, abdominal pain continues, and an ill-definable tumor mass appears over the region of the pancreas. Septic fever, leucocytosis and other evidence of suppuration give indication of a peripancreatic abscess limited by the lesser peritoneal cavity.

Examination of the pancreas of individuals who have died within three or four days after the onset of such symptoms shows the characteristic lesion of acute hemorrhagic pancreatitis. The organ is very greatly enlarged and infiltrated with blood, which soon assumes a reddish black or black color. Microscopical examination shows that the tissue of the gland has in great part undergone necrosis. Study of the etiology and pathology of this remarkable condition has added an important fact to its somewhat obscure symptomatology.

A review of cases contained in the somewhat voluminous literature of the subject has shown that a considerable proportion are associated with gall-stones present in the gall-bladder or in the bile passages. I have collected 41 such cases

from the literature, and doubtless in many other instances their presence has been overlooked or unrecorded. In four of five cases which have come under my observation gall-stones have been present.

A case which I have described and since frequently cited serves to explain the relation between cholelithiasis and acute hemorrhagic pancreatitis. Examination of the pancreatic and common bile ducts in this case has pointed to a mechanism capable of causing the lesion, and clinical and experimental observations have clearly shown that this mechanism is the etiological factor in many, if not in all, cases. The larger duct of the pancreas, the duct of Wirsung, and the bile duct, it is well known, join before entering the intestine and in most cases form a short common channel known as the diverticulum of Vater. In the case referred to a small gall-stone had so lodged at the orifice of this diverticulum that it had converted the two ducts into a continuous closed channel from which neither the bile nor the pancreatic juice could escape. Bile had penetrated into the pancreatic duct, doubtless injected as it were by the gall-bladder, and had caused characteristic staining of this duct by bile. The pancreas was the seat of extensive hemorrhagic necrosis.

A review of 41 reported cases in which gall-stones have been found in association with acute pancreatitis, has shown that in seven instances a calculus was lodged at the duodenal orifice of the common bile duct so that, as in the case I have described, mechanical conditions favored the penetration of bile into the pancreas. In a case of acute hemorrhagic pancreatitis, reported by Dr. Thayer, the orifice of the diverticulum of Vater was much dilated. and the calculus which had been recently expelled was found within the lumen of the duodenum. Doubtless in many instances the calculus lodges only temporarily within the diverticulum of Vater and escapes into the intestine.

It has long been known that a variety of irritant substances including various acids and alkalies injected into the pancreatic duct of animals causes typical hemorrhagic pancreatitis with disseminated fat necrosis, but there is little probability that such substances ever enter the duct in man. Directed by the suggestion which the foregoing cases offer I have performed a series of experiments to determine if bile injected into the pancreatic duct can cause the lesion. Typical hemorrhagic pancreatitis accompanied by disseminated fat necrosis has resulted when the bile of one dog has been injected into the pancreatic duct of a second. The result is not surprising, since the number of irritant substances which produce the lesion experimentally is considerable. Necrosis with hemorrhage resembling that which affects the pancreas does not occur in other organs as the result of similar irritation. The gland secretes ferments which are capable of digesting its own substance, but for reasons which as yet are not entirely clear the living cells of the gland are protected from self-digestion. When, however, the tissue is injured by the presence of bile or other irritant substance the pancreatic ferments doubtless cause further destruction. Physiological observations from the school of Pawlow, already cited, have a bearing upon the present subject; in the presence of bile the activity of the pancreatic ferments is increased. That the activity of the fat-splitting ferment is especially augmented may explain the wide dissemination of fat necrosis in association with acute hemorrhagic pancreatitis.

The clinical aspect of the facts just described is the following: (1) The presence of jaundice, or the history of previous attacks of gall-stone colic may give confirmation to the diagnosis of acute hemorrhagic pancreatitis when somewhat indefinite symptoms suggest the presence of this condition. (2) When at operation undertaken for the relief of obscure abdominal symptoms, disseminated fat necrosis indicates the presence of acute hemorrhagic pancreatitis, examination of the gall-bladder and bile passages will in a considerable proportion of cases reveal the presence of gall-stones. Their removal offers the best chance of recovery.

In a woman, forty-one years of age, recently under the care of Dr. Howard A. Kelly, disseminated fat necrosis noted at operation suggested the presence of acute pancreatic disease, and the well-marked enlargement of the pancreas confirmed the diagnosis. The gall-bladder contained a large number of small gall-stones. Cholecystotomy with removal of the calculi was followed by recovery.

It is noteworthy that in this case and in another in which acute pancreatitis was associated with cholelithiasis, recognized, however, only at autopsy, the patient passed clay-colored stools.

The occurrence of acute hemorrhagic pancreatitis in association with cholelithiasis adds another to the grave complications of the latter disease. Compared with cholelithiasis, however, acute hemorrhagic pancreatitis is a very rare disease. Since the lodgment of a calculus in the diverticulum of Vater may cause this lesion of the pancreas, it is pertinent to inquire why it does more frequently follow the expulsion of gall-stones from the common bile duct into the duodenum. Certain conditions must be fulfilled in order that a calculus can convert the bile and pancreatic ducts into a continuous closed channel. On the one hand the calculus must be of such small size that it is capable of occluding the duodenal orifice of the diverticulum without obstructing the two ducts that enter it. In all of the cases of acute pancreatitis which I have examined the gall-stones present in the bile passages and in the gall-bladder have been of very small size. On the other hand the anatomical conformation of the diverticulum of Vater in a considerable proportion of all individuals is such that the mechanism described could not result even were a gall-stone of suitable size lodged at the common duodenal orifice of the two ducts. In one of ten

individuals the pancreatic and bile ducts have no common channel, but open side by side at the summit of the bile papilla. Indeed, in only 32 of one hundred specimens which I have examined, was the diverticulum so formed that it could obstruct the passage of a calculus which would not completely fill it. In only three of about ten individuals, therefore, are the anatomical conditions such that a small calculus might divert bile into the pancreatic duct.

What has been said in regard to acute hemorrhagic pancreatitis applies with some modification to the condition known as gangrenous pancreatitis, which is a secondary stage of the hemorrhagic lesion. Gangrenous pancreatitis is usually associated with suppuration limited to the lesser peritoneal cavity, and its treatment is that of localized peritoneal abscess.

Another lesion which has its origin in the secreting apparatus of the pancreas is the chronic inflammation which follows obstruction or ascending infection of the pancreatic ducts. When the pancreatic ducts of an animal are ligated, chronic inflammation rapidly ensues and bands of thickened connective tissue are formed between the lobules which make up the organ. The human pancreas is provided with two ducts which in most instances anastomose within the gland, but in the great majority of cases the lesser duct which has its orifice nearer the stomach is so narrow that it is incapable of acting as an outlet for the entire pancreatic secretion. In man, as in lower animals, occlusion of the ducts is followed by chronic inflammation characterized by the formation of thick interlobular bands of fibrous tissue. Extensive destruction of the secreting acini results, but there is a well-marked tendency to spare the peculiar islands of Langerhans already mentioned. These are implicated only when the lesion is far advanced.

Occlusion of the larger pancreatic duct is most frequently caused by calculi formed within the pancreas, by biliary calculi or by carcinoma compressing the duct. It is in such cases, especially, that the digestive disturbances usually attributed to pancreatic disease have been observed. Prof. Fitz has collected from the literature 29 cases of pancreatic disease in which fatty stools were noted during life. In 14 cases cancer was present, in seven, calculi, and in two additional instances the pancreatic duct was obstructed. The small number of these cases indicates how infrequently fatty stools serve to aid the diagnosis of pancreatic disease.

Particularly noteworthy is the fact that obstruction of the pancreatic duct and consequent chronic inflammation of the interlobular type may be caused by a biliary calculus which has lodged in the common bile duct near its duodenal orifice. A small gall-stone impacted at the orifice of the diverticulum of Vater might cause acute hemorrhagic pancreatitis by diverting bile into the pancreatic duct in the manner already described, but a larger stone would completely fill the common part of the two ducts and cause obstruction both of the bile duct and of the pancreatic duct. Chronic inflammation of the gland would result, particularly since the bile passages in such cases are not infrequently the seat of infection and perhaps of suppurative inflammation.

Both Riedel and Mayo-Robson have emphasized the surgical importance of recognizing chronic interstitial pancreatitis in association with gall-stones. Both have pointed out that in a certain number of operations undertaken for relief from gall-stones the head of the pancreas is found to be so indurated that the existence of carcinoma is suspected. Indeed, in several instances a grave prognosis has been based upon the discovery of this induration, but the subsequent recovery of the patient has disproven the diagnosis of malignant disease. Mayo-Robson, who has described several cases in which chronic interstitial pancreatitis accompanied cholelithiasis, attaches considerable clinical importance to the former condition, believing that it causes severe pain in the epigastrium and in the midscapular region, vomiting at times, loss of weight and strength, and even death with increasing weakness. Cholecystotomy with drainage of the gall-bladder, and, when necessary, removal of the gall-stones has been followed by recovery.

In three cases seen at autopsy I have found chronic interstitial pancreatitis in association with cholelithiasis. In one case a large gall-stone was lodged near the duodenal end of the common bile duct, in such position that it compressed the pancreatic duct as it entered the diverticulum of Vater. In the other two cases, though at autopsy no calculi were found in the common bile duct, it is not improbable that chronic pancreatitis may have resulted from their former lodgment in this position.

The lesions previously described have had their origin in the secreting apparatus of the pancreas. When they cause complete destruction of the organ they necessarily inhibit all its functions. Another group of lesions, however, inhibits primarily that influence which the organ exerts on metabolism through the medium of the circulation, that is, the so-called internal function.

Clinical observation, inaugurated by Thomas Cawley as early as 1788, has shown that diabetes mellitus is frequently associated with grave disease of the pancreas, but the relationship of the pancreas to carbohydrate metabolism has not been clearly recognized until von Mering and Minkowski succeeded in completely extirpating the organ in dogs. Their experiments, which mark an epoch in the knowledge of diabetes, demonstrate as is well known, that sugar appears in the urine within a few hours after the complete removal of the gland. Glycosuria continues, the animal develops symptoms which are analogous to those of human diabetes, and death results after several weeks. Such experiments prove that in the absence of the pancreas the tissues of the body are no longer able to assimilate sugar; it accumulates in the blood and is excreted by the kidneys.

The relationship of the pancreas to carbohydrate metabolism can be shown in other ways. Particularly noteworthy are the recent observations of Dr. Herter who has found that adrenalin chloride painted upon the pancreas of dogs causes temporary glycosuria lasting several hours. When oxidized this substance no longer has the same action. By subsequent observations he has shown that a considerable number of diverse substances, which in general may be grouped together as reducing agents applied to the surface of the pancreas, cause glycosuria.

The pancreas is essential to normal carbohydrate metabolism, but how it acts has long been obscure. It has been maintained that the organ furnishes to the blood some substance, a hypothetical internal secretion, which is capable of decomposing sugar. The French chemist, Lepine, has claimed that the blood of normal animals contains a glycolytic ferment which is absent in animals deprived of the pancreas, but these observations have not been confirmed. Investigations of Otto Cohnheim appear to have supplied evidence that the pancreas furnishes to the blood a ferment which controls the metabolism of sugar. Cohnheim directs attention to the well-known fact that sugar in large quantity is broken up in the muscles, presumably by the action of some ferment; yet it is not possible to obtain from the muscles a ferment which has a noteworthy glycolytic action. By the use of special apparatus muscle is frozen, very finely divided, and subjected to a pressure of three hundred atmospheres. The fluid which is expressed does not cause the decomposition of grape-sugar, but if it is mixed with fresh pancreatic tissue similarly treated, the expressed juices thus obtained have the power to break up grape-sugar so that it is no longer recognizable by its reducing action. This glycolytic action is accomplished by neither organ acting singly, but by the two in combination. The change is doubtless referable to two ferments which bear to one another a relation similar to that which the enterokinase of Pawlow, already mentioned, holds to the trypsinogen of the pancreatic juice, the first being capable of bringing the second into action. Hence it appears that the pancreas furnishes to the blood a ferment which acting upon the muscle makes it capable of assimilating grape-sugar.

In animals complete extirpation of the pancreas is followed by diabetes, partial extirpation of the gland is followed by diabetes only when the part remaining represents a very small fraction of the whole organ. Destructive lesions of the pancreas are accompanied by diabetes when almost the whole organ is implicated, but when a considerable part is unaffected glycosuria is absent. Hence it results that acute hemorrhagic pancreatitis is seldom accompanied by glycosuria. In only two of 41 cases of hemorrhagic pancreatitis and in but three of 40 cases of gangrenous pancreatitis collected by Körte was sugar present in the urine. The necrosis characteristic of both the hemorrhagic and gangrenous lesion rarely if ever causes complete destruction of the gland, and in most instances leaves uninjured a part sufficient to carry on the internal function of the organ. Carcinomatous new growth invading the gland and replacing the parenchyma may so completely destroy the organ that diabetes results. It is evident, therefore, that diabetes mellitus, or at least glycosuria, may be regarded as a symptom of pancreatic disease.

Of the pancreatic lesions which have been found associated with diabetes doubtless the most common is chronic inflammation causing an increase of the interstitial tissue of the gland. Chronic interstitial pancreatitis is, however, more common than diabetes and is in the larger number of cases unaccompanied by the disease. Reference has already been made to the chronic inflammation which follows obstruction to the outflow of the pancreatic juice. The lesion which results is probably due in part at least, to infection of the stagnant secretion with bacteria from the duodenum, and a similar lesion may occur in consequence of ascending infection of the duct without occlusion. When chronic pancreatitis has its origin in the pancreatic ducts, newly formed tissue makes its appearance as course bands separating lobules and groups of lobules, the secreting parenchyma undergoing a variable degree of destruction. The ductless structures known as islands of Langerhans, on the contrary, are almost wholly unaffected, and often persist, though the parenchyma which previously surrounded them has been completely destroyed and replaced by dense fibrous tissue. This type of chronic pancreatitis, which may be designated interlobular, has been described in order that it may be distinguished from a second less frequent type characterized by the presence of fine strands of newly formed fibrous tissue within the lobules and between the secreting acini. While with the interlobular type of inflammation the islands of Langerhans are spared, with this second type which may be designated interacinar, since the new tissue penetrates between the secreting acini, the islands of Langerhans are invaded and their cells destroyed.

It has been necessary to discuss the histological details just cited in order to define that form of pancreatitis which is associated with diabetes mellitus. Interlobular pancreatitis, which spares the islands of Langerhans, is accompanied by diabetes mellitus only when it is so far advanced that the islands of Langerhans are finally altered, in common with the greater part of the secreting parenchyma. In a previous report I have described 21 cases of interlobular pancreatitis, in only one of which was diabetes present. In this case diabetes mellitus on the one hand was of mild type and glycosuria had disappeared when the patient was given a diet poor in carbohydrates, while on the other hand interlobular pancreatitis was so far advanced that the islands of Langerhans were surrounded and compressed by dense fibrous tissue. In six additional cases which I have re-

cently observed, interlobular pancreatitis has been unaccompanied by diabetes.

Interacinar pancreatitis, on the contrary, invades the islands of Langerhans and is accompanied by diabetes mellitus unless the lesion is of only very slight severity. In seven of nine cases which I have previously reported diabetes mellitus has been present.

Convincing evidence that the islands of Langerhans exert that influence upon carbohydrate metabolism, which heretofore has been attributed to the pancreas as a whole is furnished by a series of six cases in which the islands of Langerhans have been the seat of a peculiar hyaline change, wholly or partly destroying their cells. In all of these cases diabetes mellitus of variable severity had been present. In four instances interacinar pancreatitis was associated with the lesion, but in two cases the secreting parenchyma exhibited no noteworthy change, while the islands of Langerhans were in large part destroyed. The lesion has served the purpose of an accurately performed experiment selecting and destroying these structures which are embedded here and there in the parenchyma and in consequence of this lesion has occurred the same disturbance of carbohydrate metabolism which follows extirpation of the entire pancreas in the lower animals.

I have limited myself to a consideration of the cases which have come under my own observation. The conclusions, however, have been recently confirmed by a considerable number of observers who have studied changes in the pancreas associated with diabetes mellitus. Cases of diabetes accompanied by well-marked lesions of the ductless islands of Langerhans have been described by Wright and Joslin, Herzog and Steel, Gentis, Ssobolew, Weichselbaum and Stengl, Schmidt, Curtis, and Finney.

It must be borne in mind, however, that diabetes mellitus may occur without any demonstrable change in the pancreas. In a fairly large proportion of cases, constituting at least a third, the organ is found by gross and microscopical examination to be normal. Indeed, this fact is not surprising when we recall the complexity of sugar metabolism and the variety of factors which influence it. Experimental observations have demonstrated that temporary glycosuria may be produced by various injuries inflicted upon the central nervous system, notably by Claude Bernard's puncture of the floor of the fourth ventricle. Temporary glycosuria, it is well known, may be caused by the administration of the glucoside phloridzin which apparently so acts on the kidneys that they excrete part of the sugar that is normally present in the blood. Such facts do not explain the occurrence of human diabetes without lesion of the pancreas, but serve, nevertheless, to indicate that changes other than those which affect the organ may cause a disturbance of carbohydrate metabolism.

Of great significance are the observations of Cohnheim to which reference has already been made; outside the body disintegration of sugar cannot be brought about by the action of pancreatic substance, but when the expressed juice of pancreatic tissue is combined with that derived from muscle, the two in combination can cause glycolysis. If these results be accepted, it is not hard to believe that the disturbance of carbohydrate assimilation which is associated with diabetes may result from conditions which affect the muscular system even though the pancreas remain normal.

The relation of diabetes mellitus to lesions of the pancreas explains, I believe, the frequent association of diabetes with certain other diseases. It has long been known that cirrhosis of the liver is not uncommonly accompanied by diabetes mellitus so that diabetes with cirrhosis has been described as a special type of the disease. Among 280 cases of diabetes observed by Naunyn 29 were with cirrhosis of the liver, a proportion of one in ten. A considerable number of observers have noted the coexistence of cirrhosis and chronic interstitial pancreatitis, and in some of these cases diabetes mellitus has been present during life. Doubtless these lesions of the two organs may be dependent upon the same etiological factor and in several instances the individuals affected have given a history of excessive use of alcohol. Two cases of diabetes with cirrhosis of the atrophic type of Laennec have clearly defined for me the relationship of these two lesions, for in both instances chronic interstitial pancreatitis was present and was of the interacinar type, the islands of Langerhans being implicated in the sclerotic process. Through the kindness of Dr. Libman of this city I have had the opportunity of examining the pancreas from a third case of diabetes with cirrhosis and here too the organ has been found to be the seat of interacinar inflammation.

The remarkable condition known as bronzed diabetes offers an excellent illustration of the coexistence of cirrhosis and chronic pancreatitis in association with diabetes mellitus. The deposition of an iron containing pigment in the liver, pancreas and other glands is accompanied by chronic interstitial inflammation of these organs, and is associated with bronzing of the skin, and in the later stages of the diseases, with diabetes mellitus which is in such cases the usual cause of death. This rare condition has been designated bronzed diabetes particularly by French writers who have described the greater number of reported cases. I have studied and described an example of this condition of pigmentary degeneration; the pancreas was the seat of the interacinar type of pancreatitis. The lesion was, however, little advanced, and the patient who died with typhoid fever, had not apparently suffered with diabetes. Beattie has recently reported a case of bronzed diabetes in which the pancreas was the seat of chronic inflammation implicating the islands of Langerhans.

The following conclusion based upon the facts

just cited is, I believe, justified: When diabetes mellitus is found in an individual suffering with cirrhosis of the liver, the former disease is dependent upon the coexistence of chronic interacinar pancreatitis, doubtless produced by the same etiological factor, in some cases alcoholic excesses, which is responsible for the hepatic disease. In these cases at least it is possible to make a diagnosis of pancreatic diabetes.

In another group of cases, not inconsiderable in number, diabetes is associated with advanced arterial sclerosis. The frequent coexistence of the two conditions is not surprising since both occur more frequently with advanced age and in many cases, particularly where arterial disease is slight, their coexistence is probably accidental. Cases of chronic interstitial pancreatitis with arterial sclerosis have been described by several writers and in three of nineteen cases of diabetes, which I have described, degenerative changes were recognizable in the small arteries of the pancreas. In one case in which death occurred with gangrene of the leg, due in part at least to calcification and occlusion of arteries, the pancreas was the seat of chronic interacinar inflammation causing changes in the islands of Langerhans. I have recently seen at autopsy a similar case in which the arteries of the gland exhibited well-marked obliterative endarteritis. The occurrence of chronic pancreatitis in association with advanced general arterial sclerosis has this significance: When during life diabetes accompanies advanced arterial disease, it may with much probability be referred to chronic interacinar pancreatitis.

Lancereaux, more than twenty-five years ago, attempted to define clinically two types of diabetes: diabetes with emaciation due to disease of the pancreas and diabetes with obesity unaccompanied by lesion of the organ. Few clinicians have accepted the criteria proposed by Lancereaux and the existence of pancreatic disease is rarely established unless an autopsy is performed. In a few cases diabetes is associated with some lesion which causes such advanced destruction of the secreting elements of the gland that digestion suffers and fat or undigested proteids are readily recognizable in the feces. In these cases pancreatic disease is usually the result of longstanding occlusion of the pancreatic duct, causing injury to all elements of the organ, or to carcinoma invading and destroying it. In other cases, as I have just pointed out, associated cirrhosis of the liver or advanced general arterial sclerosis may give indication that the pancreas is at fault. In a large proportion of cases, however, it will be impossible with our present knowledge to decide during life if diabetes is referable to a lesion of the pancreas.

Even if in every case of diabetes mellitus it were possible to accurately determine the relation of the disease to the pancreas, the application of this knowledge to the treatment of the case would not at present be clear. For a few diseases a specific method of treatment has been deduced from a knowledge of etiology and pathogenesis. As an example of this logical sequence may be cited myxedema, a disease in some respects analogous to diabetes mellitus. When it had been established that the disease was due to impaired activity of the thyroid gland, a remedy was found in the thyroid tissue or its extracts obtained from lower animals, since the necessary internal secretion of the gland can be replaced by thyroid extracts administered by mouth or injected into the subcutaneous tissue.

Since the pancreas furnishes to the blood a so-called internal secretion, perhaps a ferment, necessary to normal carbohydrate metabolism, and since diabetes mellitus results when the pancreas is no longer capable of supplying this need, the possibility of artificially replacing the defect has suggested itself. A number of observers, among them Minkowski, found that fresh pancreas or extracts derived from it administered to dogs deprived of their pancreas failed to prevent glycosuria or to diminish its severity when established. No greater success has followed the administration of pancreatic tissue or its extracts to patients suffering with diabetes mellitus, and a considerable number of careful observers have failed to discover any noteworthy effect upon the amount of sugar excreted by diabetics subjected to such treatment. There is, however, some clinical and experimental evidence to show that when diabetes is the result of a destructive lesion which inhibits the digestive function of the pancreas, some benefit may be obtained by supplying to the intestine pancreatic ferments. A remarkable case described years ago by Fles has been frequently quoted. Diabetes mellitus was accompanied by disturbed digestion, abundant fat and undigested muscle fibers being recognizable in the feces. A watery extract made from the entire pancreas of a calf was daily divided into three parts and one part was administered after each meal. Though the patient continued upon a diet of bacon and fat meats, fat disappeared from the feces at the end of two days, but glycosuria persisted unchanged. Whenever the administration of the extract was discontinued, fat and undigested muscle fibers reappeared in the feces. The general condition of the patient was improved for a time, but death finally occurred as a result of phthisis. Autopsy showed that the pancreas was the seat of very advanced sclerosis. In a somewhat similar case Oser administered pancreatin with good result.

Recent observations of Cohnheim upon the glycolytic power of pancreas and muscle in combination suggest new possibilities concerning the nature of diabetes mellitus and may finally explain the failure to supply with pancreatic extracts deficiency of the internal function of the pancreas. Few diseases have been the subject of more careful experimental and clinical study and we are in possession of many important facts concerning the pathology and chemistry of diabetes mellitus. Still more accurate knowledge will doubtless find far reaching application.

THE PROPHYLAXIS AND MEDICAL TREATMENT OF DISEASES OF THE PANCREAS.[1]

BY GLENTWORTH R. BUTLER, M.D.,
OF BROOKLYN, N. Y.

THE subjects assigned for this paper are the prophylaxis and the medical treatment of diseases of the pancreas. These topics are at first glance of an alluring interest. But the results of investigation and sober second thought are distinctly suggestive of certain chapters of a work which was written many years ago by a simple-minded and ingenuous student of nature. This book was entitled "The Natural History of Iceland." The seventy-second chapter consists of one sentence, which reads thus: "There are no snakes to be met with throughout the whole island." The forty-second chapter is even more direct, succinct, and informing. It says, "There are no owls of any kind in the whole island."

Prophylaxis.—The attempted prevention of diseases of the pancreas lies in an appreciation of their causes. Among the etiological factors assigned are syphilis, tuberculosis, arteriosclerosis, alcoholism, cardiac, pulmonary, and renal disease, acute and chronic infections, obesity, diabetes (not of pancreatic origin), neoplasms in close proximity to the pancreas, catarrhal and bacterial diseases of the intestine, and affections of the liver and gall-bladder (especially cholelithiasis). If therefore one or more of the conditions just rehearsed are capable of successful treatment, as may be the case, *e.g.*, syphilis, or surgical removal of gall-stones, by so much is the liability to pancreatic disease lessened or terminated. Beyond this we cannot, at present, go.

Medical Treatment.—Pancreatic disease is probably by no means of such infrequent occurrence as we commonly suppose. Nevertheless, owing to the great difficulties of diagnosis, its existence is rarely recognized *intra vitam.* The great majority of cases of disease of the pancreas recover or die without a correct and certain determination of their nature having been made. Naturally, therefore, medical treatment addressed directly to the diseased organ, even were it possible, is seldom practised. This paper does not, of course, deal with the question of surgical interference, which has afforded some brilliant successes.

Various remedies have been used with reported good results, but the correctness of the diagnosis in each case is open to doubt. Thus in chronic pancreatitis iron, nitro-muriatic acid, chlorine, calomel, and corrosive sublimate have been put forth as efficacious remedies. Much work has been done in the line of organic therapeutics, especially in cases of supposed pancreatic diabetes, by the administration in various ways, of the pancreas and its preparations. Some of these methods are the giving by the mouth of pancreatin, or the expressed juice, or the extract of the finely ground fresh pancreas of the calf or sheep, made with water, physiological salt solution, or glycerin, or the eating of the raw minced or slightly broiled pancreas, or taking it in capsules, or spread upon bread. The juice of the gland, and the minced gland macerated in an alkaline salt solution, have been given by enema. The expressed juice and the glycerin extract have been administered subcutaneously. The immediate implantation of the pancreas from a just killed sheep has also been undertaken, the patient dying in coma.

The practical results of pancreas-therapy have been disappointing in that disease of the organ has not been modified. On the other hand, when the disease is one which causes a lack of pancreatic juice, the use of efficient pancreatic preparations has in some cases measurably improved the digestion of fats and proteids. The internal use of ox-gall has also distinctly assisted the assimilation of fats.

In the present state of therapeutics the medical treatment of pancreatic disease is confined to the relief of symptoms, *e.g.*, pain, or jaundice, by the usual methods; and the maintenance of the strength of the patient by rest, careful feeding, and other commonly employed means, in order that he may survive the course of the disease or be better able to cope with the strain of an operation. When the presence of pancreatic calculi has been correctly diagnosed the injection of pilocarpine, which has been proved to increase the pancreatic secretion, should be practised, one successful case having been reported from Eichhorst's clinic. We may, however, look forward hopefully to the results of such work as has been done by those who have preceded, or will follow, me to-night, for these brief remarks form simply a bare condensation of the labors of many patient and splendid workers in a most interesting field.

[1] Read before the Medical Association of the Greater City of New York, February 8, 1904.

THE CLASSIFICATION AND SYMPTOMATOLOGY OF DISEASES OF THE PANCREAS.[1]

BY CHARLES G. STOCKTON, M.D.,
OF BUFFALO, N. Y.

THE classification of diseases, always difficult and usually unsatisfactory, is especially so as relates to the pancreas. This in part is because our knowledge of the pathology is incomplete and in part because the pancreas secretes certain enzymes or other active principles which, in the presence of disease, lead to peculiar and remarkable changes both in function and in structure, so that it is difficult to apply the stereotyped terms of classification.

Tumors of the pancreas occur as carcinomata of various forms, especially the dense, hard growths,—adenomata, tuberculosis, syphilis and cysts,—the last being divided into at least three varieties: retention cysts, proliferation cysts and hemorrhagic cysts. Much could be written on the symptomatology of these affections, but it must be passed at this time.

[1] Read at a symposium before the Medical Association of Greater New York, Feb. 8, 1904.

The so-called inflammatory diseases of the pancreas at once involve us in difficulty. Chronic pancreatitis is usually described as indurative, although fatty degeneration and ingrowth of adipose tissue often form a considerable part of the mass. Under the heading of chronic indurative pancreatitis we have to do with the degenerative processes, in some instances beginning with the blood vessels, in others with the duct of the gland, and in still others as the result of inflammatory processes reaching the pancreas from without. It may be a diffuse process involving the entire organ, or it may be confined to certain regions only. We have come to accept two forms of distribution of the fibroid degeneration, one the ordinary interlobular type, the other characterized by diffuse proliferation of the interacinar tissues which invades the islands of Langerhans and apparently constitutes the structural change upon which pancreatic diabetes depends. Especially in the interlobular pancreatitis there is marked hyperplasia of connective tissue, and the organ is sufficiently hard to make the term indurative quite appropriate, and when so is not infrequently mistaken for malignant growth. When the induration involves the head of the pancreas, it may, from pressure, obstruct the common bile duct and give rise to phenomena that suggest malignant growth, or cholelithiasis. If the choledochus escapes there may still ensue symptoms of more or less importance, depending upon interruption of the pancreatic function. If the disease invades the islands of Langerhans, we may encounter a persistent diabetes; but if these regions are spared in part or whole, nothing more than a transient glycosuria would be expected. The other symptoms are those of intestinal indigestion and, occasionally, fatty stools, lipuria, sialorrhea, emaciation, and in some instances severe anemia. Robson considers the diagnosis difficult, but this is not always so, as has been proven by operation and by autopsy. Given a palpable induration in the region of the pancreas, with disturbance in intestinal digestion, with, at times, traces of sugar and albumin in the urine, with or without increased salivation, fatty stools or lipuria and depreciation in general health without the cachexia of cancer, then one may make a provisional diagnosis of chronic indurative pancreatitis.

Robson and Moynihan dispose of the question of the classification of inflammatory diseases of the pancreas by dividing them into the acute, subacute and chronic forms. Fitz describes pancreatic hemorrhage, acute hemorrhagic pancreatitis, gangrenous pancreatitis and suppurative pancreatitis as well as the chronic forms. Oser speaks of acute hemorrhagic pancreatitis, suppurative pancreatitis, besides the chronic forms before alluded to. It does not seem to be satisfactory to attempt the explanation of acute pancreatic processes along the line of ordinary inflammation. It is true that the pancreas may become invaded by bacteria and, as a result, acute inflammatory processes develop, with hemorrhage, with necrosis, to which some apply the term gangrenous, usually accompanied by the fat necrosis of Balser. But while it is true that this results from ordinary inflammation of the pancreas consequent upon infection, we frequently find the same processes at work with entire absence of infection, the diseased tissues proving sterile to carefully conducted culture methods. In some instances an inflammatory reaction is evident, in others it is entirely lacking. What is present in all cases is the escape of pancreatic secretion into the tissue, the consequent necrosis of the pancreas and surrounding parts, accompanied by hemorrhage, liquefaction necrosis, and fat necrosis. While it is admitted that these phenomena may be excited by an inflammation of the organ, we must not lose sight of the fact that there are cases free from infection, and inflammation, as we are in the habit of using that term. It would seem to me just as correct to speak of peptic ulcer of the stomach as a localized inflammation as to apply that term to those cases of necrosis of the pancreas under discussion. In short, it would seem that the term necrosis should be used insted of inflammation in describing certain instances of acute disease of the pancreas. One of the most significant facts is the presence of hemorrhage in these cases; it seems to be a very early as it is an important step of the morbid process. Just why the hemorrhage occurs is not so easily explained. Of course, some pathologic agency must induce the hemorrhage, but to hold that this is inflammation in all cases would appear to be pure assumption. The difficulty is increased by the fact that the non-infected cases and some of the infected ones may follow a course apparently identical. Some infections of the pancreas lead to pus formation, what is called suppurative pancreatitis, or abscess of the pancreas. Such a case follows a different course from that of the so-called hemorrhagic pancreatitis. In the latter, even with extensive destruction of the tissues of the pancreas as well as of the surrounding structures, so that there may occur the sequestration of the pancreas and the accumulation of a liter or more of liquefied tissue, no pus whatever is found. This remarkable state of affairs is quite unlike what happens in inflammation and is unparalleled in pathology.

The symptomatology of acute hemorrhagic pancreatitis and that of hemorrhage into the pancreas are very closely related. Indeed, as has been said, hemorrhage may be the first recognized step in the necrotic process. In the onset there is intense pain in the lower part of the epigastrium, manifestations of shock, generally nausea and vomiting. These symptoms may subside after a few hours, or continue for a few days, and then subside. Not infrequently the pain diminishes, but the prostration continues, vomiting recurs, cyanosis appears, the temperature is raised from one to three degrees, and the pulse becomes more frequent, small, feeble and compressible. The abdomen is slightly distended, and there is in-

creased resistance in the upper half of the abdomen, where the tenderness is usually considerable, sometimes very marked. The general appearance of the patient suggests a grave abdominal trouble which is more striking in some cases than in others. The bowels are usually somewhat sluggish, but lack the motor paresis of peritonitis. The symptoms are increased by movements of the body, and yet there is not the disinclination to change position which is seen in those suffering from peritonitis. Sometimes the vomiting is so persistent that obstruction of the bowels is suspected; at other times the tenderness and pain in the upper part of the abdomen is so marked that one becomes suspicious of perforation of the stomach, gall-bladder or intestine. In a few instances slight transient glycosuria appears and traces of albumin in the urine are to be expected. Patients may continue in this condition for several days, or even weeks. I have known recovery from an attack to take place, the patient succumbing to a second seizure, as verified post mortem. More often the process continues for a few days without marked change, when somewhat suddenly the prostation increases, the pulse becomes "running" and almost imperceptible, and death results apparently from abdominal shock. Sometimes the patient sinks into a stupor during the last twenty-four hours, in other cases intelligence continues until the end. I have seen cases that were mistaken for intestinal obstruction, perforation of the gall-bladder and appendicitis, and yet it would seem that those who have carefully studied one typical case there would be little danger of misunderstanding the nature of the disease on a second occasion.

Now, as to suppurative pancreatitis or pancreatic abscess, it must be understood that there is considerable variation of the symptoms in different cases. Where the suppuration is associated with hemorrhagic pancreatitis we must expect to find the symptoms of the latter to which are added those of septicemia. On the other hand, there are instances in which the manifestations are merely those of suppuration in the upper part of the abdomen, and the element of shock may be less marked than in the hemorrhagic form of the disease. For some reason the pancreas appears to tolerate better the presence of pus than it does the escape of pancreatic secretion into its tissues. It is hard to explain why the presence in the pancreas of certain infections or the entrance therein of bile (according to Opie), or a slight hemorrhage into its substance is capable of producing a rapid, extensive and fatal necrosis of the organ and surrounding parts, and yet that suppuration may continue for a considerable period, in some instances, without producing the phenomena of acute hemorrhagic pancreatitis; nevertheless, there exist abundant data to show that such is the case. It is therefore proper in classification to put down suppurative pancreatitis as a process separate and distinct from that of so-called acute hemorrhagic pancreatitis or necrosis.

In making this statement one should repeat this reservation, namely, that in a proportion of cases we find both purulent and hemorrhagic pancreatitis in the same case, excited apparently from the same cause and producing a group of symptoms that include those which relate to hemorrhage, necrosis and suppuration. Leucocytosis is to be expected in suppurative cases, but is inconspicuous or absent in those of other types. That singular phenomenon, the fat necrosis of Balser, occurs in most, but not all acute processes of the pancreas, whether suppurative, necrotic or inflammatory. Its precise relation to pancreatic diseases is not yet satisfactorily explained in spite of much excellent experimental work done on the subject. In fact there remains to be elucidated a number of important and intensely interesting questions in diseases of this organ.

RENAL DECAPSULATION FROM THE PATHOLOGIST'S POINT OF VIEW.[1]

BY JOSHUA M. VAN COTT, M.D.,

OF BROOKLYN, N. Y.;

PROFESSOR OF PATHOLOGY AND BACTERIOLOGY, LONG ISLAND COLLEGE HOSPITAL, PATHOLOGIST TO LONG ISLAND COLLEGE HOSPITAL; BROOKLYN HOSPITAL, KINGS CO. HOSPITAL, AND CONSULTING PATHOLOGIST, ST. JOHN'S HOSPITAL.

THE operation of renal decapsulation for the palliative or curative treatment of chronic nephritis involves three fundamental propositions for consideration: (1) The nature of the renal circulation; (2) The modus operandi of the restitutio ad integrum in highly differentiated organs; (3) The etiology and pathology of the disease.

In order to establish the validity of such a procedure, it is necessary to show that stripping of the capsula propria, and adhesion of the capsula adiposa are competent to reinforce the cortical circulation, and, assuming this to be possible, that the new blood supply, in operation with the laws of regeneration will arrest degenerative changes in the cortex, and restore those areas in it, which have been destroyed during the progress of the disease. Furthermore, it must be demonstrated that those causes which are responsible for the disease will cease to affect the kidneys after the operation has been successfully performed. Otherwise, if it stands proven that, by virtue of the morphology of the intrinsic renal circulation the collateral blood supply may not be drawn upon for its reinforcement, and if it be shown that regeneration sensu-strictiori does not obtain in the renal cortex; and if, again, it be true that chronic nephritis is a local expression of a general condition, it will follow as a corollary of these facts that this operation is not only futile, but must be regarded as harmful.

The Renal Circulation.—The renal artery divides at the hilum of the kidney as a rule, into four or five branches, the distribution of which, in relation to the pelvis, is such that three-fourths of the blood supply is carried anteriorily while one-fourth runs posteriorily. The arteries are

[1] Read at the Annual Meeting of the Medical Society of the State of New York, Albany, Jan., 1904.

strictly end-arteries, and branches do not cross from either side to the other. Three branches enter the cortex of the kidney after supplying the tissues of the hilus, passing over and under the renal vein into Bertini's columns. From here they cross with repeated branchings to the boundary between the cortex and medulla, so that from usually two large arteries originate in the circumference of each pyramid fine arterial ramifications whose branches have no communication with each other. These are the arterial arcades. From the arterial arcades pass smaller arteries, usually at right angles with the arcades, into the cortex where, after dividing one or more times, they split into fine branches that course in perpendicular direction between the cortical fascicles, or lobules, toward the periphery of the cortex. These are the interlobular arteries, and are wholly concerned in supplying the Malpighian tufts, excepting a certain number which go to the medulla,—the arteriolæ rectæ veræ, and to the capsule,—rami capsulares. Each interlobular artery gives off in its entire length, from two, three or four sides, a large number of fine branchlets having arterial structure, and measuring 18—45μ in diameter, which either immediately, or after a single division penetrate the capsule of Bowman. These are the vasa afferentia. From the vas afferens, immediately after its entry into Bowman's capsule are given of numerous capillaries which pursue a tortuous course within the capsule, *but do not communicate with each other.* This is the glomerulus, and the individual loops measure 7 to 9μ in diameter. They finally coalesce to form another single vessel which emerges from the capsule of Bowman and is called the vas efferens. This vessel has the import, and partially the structure of an artery; and, after emerging from the capsule resolves into the renal capillary system, which is found in both the cortex and medulla. The vas efferens is 9—18μ in diameter, about half the size of the vas afferens. It forms two sets of capillaries (1) a rich network with an elongated mesh, whose capillaries range from 4.5—9—13μ in diameter, called the arterial capillaries. This plexus surrounds the medullary rays in the cortex, and is then confluent with (2) a network of wider capillaries with a roundish-cornered mesh 11—33μ that surrounds the convoluted tubules upon all sides, and is called the venous plexus. These vessels finally coalesce to form the venous roots. These relations are constant, excepting with those efferent vessels emerging from the Malpighian tufts found in the inner zone of the cortex, near the bases of the Malpighian pyramids. Here they are distinctly larger, 22—35μ, and stretch downward into the Malpighian pyramids, running parallel to the straight tubules, being designated as the arteriolæ rectæ spuriæ. They course with repeated divisions at acute angles to the papillæ, where they decreased in size to 9—22μ, and finally are distributed here and in the medulla, in the last location emptying either through their ends, or by small twigs into the capillaries of this region which measure 6—9μ and which from the long drawn nature of their meshwork, resemble the arterial capillaries with which they inosculate at the pyramidal bases, or around the medullary rays.

Quite in resemblance with the arteriolæ rectæ spuriæ which emanate from the vasa efferentia, are certain arterioles which spring either from the interlobular arteries, the arterial arcades, or from those vasa efferentia which lie close to the medulla in the cortex. These are the arteriolæ rectæ veræ already mentioned.

The renal vein commences in two places, *i.e.*, on the surface of the organ, and in the apices of the palillae. At the periphery of the cortex they originate from the capillary networks of the cortex as small venous roots, some of which regularly surround the single lobules, and form between these somewhat larger branches,—the venæ stellulæ verheynii; others, stretching out over several or many lobules assemble to make larger branches. Both varieties then progress downward into the cortex as venæ interlobulares, and course with the interlobular arteries between the lobules, being strengthened by receiving many other venous rootlets from the interior of the cortex, which are formed from the venous capillaries surrounding the convoluted tubules. They then pass at once, or through somewhat larger branches, at right angles into the larger veins, which latter are situated with the larger arteries in the neighborhood of the pyramids, are connected by anastomosis, and finally lead into large valveless veins, which emerge from the kidney in line with the arteries. Before entering the larger veins, they receive branches from the pyramidal veins,—venulæ rectæ—which originate from beautiful capillary networks surrounding the capillary ducts, and also in part from loops springing directly from the arteriolæ rectæ.

They become thicker as they ascend between the tubuli recti by receiving small branches; and, with the arteriolæ rectæ form large vascular bundles in the boundary layer of the pyramids. The veins of this bundle empty through a certain number of larger branches into the arched ramifications surrounding the pyramids. The venous plexuses in the surface of the papillæ are finally associated not only with the venulæ rectæ, but also with the veins of the renal calices, thus forming a sort of connecting link between the outer and inner veins.

Aside from the communication of arteries and veins by means of capillaries, it has been shown by E. Steinach[2] and others that, in the neighborhood of the vascular arcades and the renal capsule there is sometimes direct anastomosis by means of precapillary vessels, which have a diameter of 10—12μ and 20μ and are at times very short, at others quite long.

The vessels of the capsula propria originate in part from the renal artery before its entrance into the hilus, from the suprarenal, lumbar, and internal spermatic arteries, also the vessels of the ureter.

According to Koelliker,[1] certain of the arteriae interlobulares, after supplying the Malpighian tufts send branches into the capsule, which break up into a wide mesh of capillaries which communicate with the capsula adiposa.

The veins of the renal capsule are in communication with those of the surrounding organs, and in part with the portal system.

It is obvious from this description of the structure and distribution of the renal blood vessels, first, that the arteries are terminals, *i.e.*, that they have nowhere any direct communication with each other, the only possible communication being intermediate through the capillary systems; second, that all of the vessels vary systematically in diameter in definite locations,—a fact which must certainly have important bearing upon the nature of the blood pressure in the various divisions of the vessels, and the renal circulation as a whole; third, that, with the exception of a few interlobular arteries which penetrate the capsula propria, and a few capsular arteries which enter the cortex, the only communication between capsule and cortex is capillary.

It is further obvious, that obstruction to the renal artery in the main trunk, or any branch must result in arrest of blood supply in an area of the kidney corresponding to the distribution of the vessel obstructed; and that, assuming reestablishment of the circulation in this area through collateral vessels, the direction of the current must be reversed. Thus it will be seen that, under such conditions, the delicate parenchyma of the kidney is subjected to two grave insults, *i.e.*, first, loss of nutrition, second, alteration of pressure due to failure of the vis a tergo in the artery, and the reversal of current in vessels of widely varying diameter.

In this connection it is to be remarked, that the history of renal infarcation coincides exactly with what would be expected of such a circulation.

Since the classical researches of Virchow[3], Cohnheim[4] and Litten,[5] upon thrombosis and embolism, and their effects upon tissues, it has become common knowledge that the regeneration of tissues in infarcted areas is per cicatrice. Whether the infarctions be hemorrhagic or oligemic, the final result is the same, *i.e.*, coagulation necrosis, organization of the necrosed area, cicatricial contraction of the organized tissue. Similar changes obtain in endarteritis obliterans, where terminal vessels are involved; and this condition is regularly present in arteriosclerotic nephritis, and the chronic diffuse indurative variety. In these kidneys the depressed cicatrices are resultant from stenosis of larger or smaller arteries, usually in the cortex, often in the medulla, which produce infarctions, corresponding in area to the district supplied by the vessel involved. Occasionally such an infarcted area receives a branch from the capsula artery, in which event, if the area be not too large, and the artery be of sufficient size, trophic conditions may be sustained for a time; but even here, in the majority of instances, there is a progressive tendency towards induration with final contraction of the area.

Over these depressed areas the capsule is often dense, and firmly adherent; so that when stripped off, considerable portions remain attached to the cicatrices, thus rendering them impenetrable to blood vessels.

Other structural changes are regularly found in those portions of the cortex which are not infarcted, such as tubular dilatation and retention cysts; so that any further loss of tissue through adhesion to the stripped capsule, which usually carries with it the extreme outer layer of the cortex, is to be regarded as highly injurious.

With these conditions at hand, can the restitutio ad integrum sensu strictiori occur in the renal cortex? Two things would be necessary to accomplish this (1) the collateral blood supply should be sufficient to restore the normal circulation, and, (2) that a highly differentiated organ such as the kidney could regenerate its component elements.

Litten's experiments show that the collateral circulation is not sufficient to restore the equilibrium; and the researches of Marchand,[6] and many others whom he quotes, prove that renal regeneration does not take place beyond a certain point. Litten conducted a series of experiments principally upon rabbits, whose kidneys closely resemble those of man, in which he ligated the renal artery alone, the renal vein, and both vessels together. He also describes in detail, and accurately, the renal circulation, including the collateral vessels. His description of the circulation coincides with that of Koelliker, quoted in this paper, and also of Brödel[7] in his valuable contribution on the subject in the *Johns Hopkins Bulletin*, 1901, in which he points out new facts of great importance to surgeons in operations on the kidney.

There is time for consideration only of some of the salient points in Litten's paper which bear upon the subject now under consideration. He found that when the parenchymatous elements in the convoluted tubules were deprived of their blood supply for a period lasting over two hours, they died, and did not regenerate. Talma[8] and Werra,[9] in later similar experiments, confirmed this observation, which is now generally accepted as a fact. It is important here because of its bearing upon decapsulation and renal regeneration. Litten also found that when either vein, artery, or both, were tied the kidney increased from one-third to three times its normal size, becoming more tense. On gross section two hyperemic zones were found,—one at the periphery of the cortex, the other in a narrow belt half in the cortex, half in the medulla. The cortical tissue between these two zones is paler.

He found that these congested zones were produced by the collateral vessels, which were sufficient in the capsule and hilum to carry the blood into the capillary plexuses, but not sufficient either in numbers or force of current to reestab-

lish the circulation, the result being that the capillaries in these zones were gradually dilated and gorged with blood, which, if the ligature remained long enough finally stagnated, with diapedesis of erythrocytes and parenchymatous degeneration. The vis a tergo being so slight the vessels become filled and cannot empty, so that stasis followed by hemorrhage, and coagulation necrosis result. This condition of the circulation also accounts for the increased size of the kidneys. Exactly the same phenomena obtain in renal infarction, the only difference being that they are restricted to the infarcted area.

Litten found that, when the artery, vein, and ureter were ligated and the capsule stripped, the kidney became neither congested nor enlarged, a matter of importance here, because it clearly shows that stripping of the capsule completely cuts off what little peripheral circulation is derived from the capsular arteries. The whole bearing of this will be apparent when the subject of regeneration is considered.

Summing up all the facts the conclusion is reached, that very little can be expected from the renal collateral circulation when the main supply of blood is compromised. As to renal regeneration, the elaborate researches of Marchand, Barth and others, prove that, where extensive destruction of the renal tissue occurs repair is imperfect and never to the degree of restoration of functional activity.

Perhaps the best description of the processes of repair in the kidney is that of A. Barth,[10] in the pathological institute at Marburg, quoted by Marchand in his elaborate work on the healing of wounds and transplantation of tissues. This investigator operated on guinea-pigs, rabbits and dogs. He resected large wedge-shaped pieces in the long axis of the kidneys and either coapted the cut surfaces with sutures, or left them slightly separated. Before examination of the kidneys they were injected with blue gelatin; and this was done at periods of from two to 102 days after the operation.

Quoting Marchand, he says: "The adhesion of the wound surfaces apposed by suture is accomplished as usual through a fine layer of fibrin. The deeper still separated wound-cavity is filled with coagulated blood, at the borders of which are gathered many leucocytes (two to twenty-four hours). In the same manner the capsular wound is closed with extravasation which also involves the parenchyma immediately surrounding the wound. Where the wound was not completely closed, the cavity thus formed was filled with blood, coagulated fibrin, and remains of necrotic parenchyma. The degenerative changes in the neighboring parenchyma begin with epithelial swelling, indistinctness of nuclei, filling of the lumina of the uriniferous tubules with a homogeneous mass, which progressively fuses with the dead epithelium. In the lumen of many tubules are gathered together with granular detritus, many leucocytes; others show fatty degeneration of the epithelial cells, while after two days mitosis appears in the better preserved cells. Necrosis of renal tissue in the neighborhood of the wound can spread to a considerable degree and assume distinctly the form of a wedge in consequence of severance of a larger ascending arterial branch. No changes are found in the remaining renal parenchyma. After four days, growth of connective tissue cells in the region of the wound is richer; they press into the coagulum filling the wound, and can be demonstrated in large numbers between the tubules of the borders of the wound as well as the capsule. The tubules in this district are in part filled with coagulum, but for the most part engaged in growth, and rich in mitoses, which latter are found in great numbers in the connective tissue—and endothelial cells. Later the mitosis grows progressively less. The actual process of healing is completed in from eight to eleven days; and is later followed by cicatricial contraction. In the cicatrix are found new-formed small tubules, which are in association with the straight and convoluted tubules of the neighborhood, but can have no functional significance. Occasionally the contraction stretches out over larger areas of the kidney, whose tubules contained in a deeper strata of the cortex show clearly widening and enlargement of the epithelial cells as well as of the glomeruli, *resembling the better preserved parts of a contracted kidney.* New formation of glomeruli was never observed."

"These investigations of Barth led him to the conclusion that regeneration of a functionally active renal parenchyma in the cicatrix does not occur, any more than restoration of a degenerated parenchyma by compensatory hypertrophy, or complete new formation as Tuffier,[11] or Kümmel[12] have claimed."

Ribbert[13] in the last edition of his general pathology adopts the same view of the nature of the process of renal regeneration.

Thus the second point is answered. It is clearly so, that the restitutio ad integrum never obtains in the kidney in the strict sense of the word, the repair always taking place in the usual way, *i.e.*, per cicatrice. So that, even assuming the possibility of renewing the renal circulation by substituting the capsula adiposa for the capsula propria, there is not the slightest warrant for assuming the occurrence of renal regeneration as a result.

Based upon pure reason, and the results of laboratory experiments, Dr. Edebohols' theory of the operation of renal decapsulation for either the cure or relief of chronic nephritis must fall—it cannot accomplish it.

As for the operation itself only certain immediate and remote results are conceivable. There is but one condition, in one variety of chronic nephritis which should logically be relieved by decapsulation, and that is the tension in a large white kidney. But even here any such relief is more than offset by the damage occasioned in the act of stripping the capsule.

The fact seems to have escaped notice, that

when the capsula propria is torn away the very vessels from which so much is expected in the renewal of the circulation are torn away also. They are forever and irrevocably gone; and it is a physical impossibility that the capsula adiposa should do anything in the way of vascular regeneration, excepting by the usual process of formation of capillary anastomosis; and as Brödel well remarks, the direction of the circulation in the capsula adiposa being away from the kidney but little could be expected from it, even if it were possible to regenerate or substitute arteries which should penetrate the cortex. Again it seems to be forgotten that, even assuming the most desirable results in renewal of the renal circulation by this operation, there must be inevitable death of considerable areas of the cortical parenchyma in its very important outer zone; for the reason that, as all authorities agree, the renal epithelia die in two hours after being deprived of their blood supply, and it requires at least four days for the production of new capillaries. Furthermore, in those kidneys where the capsule is adherent, stripping becomes really dangerous, because, as has already been remarked, in such kidneys what remains of the cortex is already compromised. The act of stripping not only damages these quasinormal areas by tearing off a portion of the outer zone, but, in the act of repair, with adhesion of the capsula adiposa to these denuded surfaces, new cicatrices are formed which in the end can only contract and increase the trouble. Finally it must be urged that this operation totally disregards the fundamental principles which are involved in chronic diffuse nephritis. Excepting in those cases where it is definitely shown that the renal disease is due to purely local causes, such as pressure, or obstruction of the circulation from stretching of the vessels, or other cause, this disease is merely a local expression of a general condition. It would be hard to find good authority for combating the view that chronic nephritis is caused either by some form of toxemia which is endogenous, or exogenous, and in the course of which toxemia the renal structures are irritated and finally degenerate, or by direct obstruction to the general circulation from cardiac disease.

Where a kidney has been dislocated, or pressed upon by some other structure, it is easy to see how good may be accomplished by anchoring the organ, or removing the obstruction; but it is inconceivable that any radical gain could come from increasing the flow of blood to the kidney whose very toxicity is assumed to be the cause of the structural changes in the organ. Much more must it be urged, that harm will result from an operation which establishes the locus minoris resistentiæ in a functionally very important tissue, and necessitates repair by a process which is in itself in the nature of a connective tissue hyperphasia, and which, under the toxemic influence must surely hasten the progress of the disease, rather than retard or cure it.

In conclusion it must be reiterated, that (1) on teleological grounds the renal circulation cannot be restored by decapsulation and substitution of the capsula adiposa. (2) No amount of restoration of renal circulation would restore the integrity of the cortex. (3) Chronic nephritis being a local expression of a general disease will yield only to such treatment as is calculated to cure the general disease; and here there can be hope only of arresting the progress of the renal degeneration. The diseased portions of the organ will never regenerate.

Last September a series of experiments was begun at the Hoagland Laboratory, under the auspices of the "Van Cott Fellowship" by myself and my colleague, Prof. Archibald Murray, the present Fellow, for the purpose of determining the effect of renal decapsulation upon normal kidneys, and also the relation of the renal collateral circulation to trophic conditions in the kidney. Cats were selected because of their high resistance to operative procedure. The operations were performed by myself, assisted by Drs. Murray and Fincke; and the work of preparing the kidneys for microscopic examination was conducted by Prof. Murray, whose faultless technic ensures accurate findings. Ether was the anesthetic employed. Under strict aseptic precautions the following operations were done:

1. The kidney was delivered through an incision in the back close to the vertebral column outside of the peritoneum. The capsule stripped, ablated, and the kidney returned through the incision which was then sutured.

2. The kidney was delivered in the same manner, and retained, after decapsulation, between the muscles and superficial integuments, for the purpose of gaining a larger capsular blood supply.

3. In both of these operations the artery alone, the vein alone, and both vessels together were ligated in secondary operations, time being allowed for the healing of the wounds of the primary operation.

4. The kidney was decapsulated, retained between the muscles and skin, and, before closure of the skin incision the cortex was deeply scarred in various areas with a Paquelin cautery at a dull red heat.

The time limit for this paper admits of only a brief résumé of the findings in these experiments. In general they agree with those of Litten. The collateral circulation was not sufficient to replace the direct circulation, even for mere trophic purposes.

In all of the operations a new thick capsule was formed, with capillary and *not* arterial anastomoses. All of the kidneys showed marked degeneration of the cortical epithelium, especially in the outer zone; and all of the new capsules showed a definite tendency to project fibrous tissue into the cortex. In the cauterized kidney the destroyed areas were replaced by cicatrices which blended with the capsule. Where vessels were ligated, the cortex presented the appearance of an early stage of coagulation necrosis.

One cat was in bad general condition at time

of operation. The kidney was simply decapsulated and returned to the abdominal cavity. It was large, and very pale. A month after the operation the animal was killed, and the kidney injected through the artery with carmine gelatine. The new capsule was found to be irregularly thick, and the injection showed only capillary anastomosis with the cortex. The cortex itself showed all the lesions of a large white kidney; and there was not the slightest evidence of any regeneration. On the contrary the tubules of the outer zone were in collapse and the epithelial cells in them completely broken down. Sixteen operations in all were done on eight cats, with the uniform result of positive injury to the normal kidney, and no benefit to the large white kidney.

These findings are in harmony with the conclusions of the paper. At a later date, a more detailed report of the results of the work done in the laboratory will be made.

In conclusion, the writer desires to express his sense of high appreciation of the earnest work and brilliant conception which led Dr. Edebohls to devise this operation and put it into practice; for, while he cannot approve of it as a procedure, it is nevertheless a tribute to the energy and faithfulness with which our American surgeons are pressing forward for the mark of the prize of their high calling, in their ceaseless efforts to relieve a suffering humanity.

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CANCER OF THE INTESTINE.

BY J. G. SHERRILL, M.D.,
OF LOUISVILLE, KY.

MY experience with several cases of secondary cancer of the intestine, and especially with two cases of primary carcinoma, specimens of which are here presented, has convinced me that many points of interest are connected with a study of this condition and it is for this reason that this subject has been selected for consideration.

The term cancer, as here applied, is to be understood as including all forms of maligant neoplasms which involve the intestinal tract. Tumors of the carcinomatous type occur with much greater frequency than do the sarcomata. While it is claimed that cancer rarely attacks the intestine primarily, yet a study of the literature for the past twenty years will show that it occurs much oftener than we have been led to believe; moreover, owing to the obscurity of the symptoms, many cases are entirely overlooked and many more are recognized but not reported. Hemmeter[1] mentions 69,083 autopsies including the collections of A. Zemann, Maydl, Müller and Nothnagel, with 5,796 carcinomata, 8.4 per cent. of the whole number. Of these carcinomata, 1,296 were of the intestine.

DeBovis[2] *(Revue de Chirurgie,* June, 1900) has collected 426 cases of cancer of the large bowel, and states that it occurs once in every 2,500 cases of illness, averages one for every 300 deaths in hospital statistics, attacks males more often than females, and is seldom seen in children. Hochenegg,[3] of Vienna, reported to the thirty-first German Medical Congress, 282 cancers of the intestine from his own experience. Nothnagel[4] found in the Wiener allgemeine Krankenhaus from 1882 to 1893, that of 2,125 autopsies upon cancer cases, 243 were of the bowel; of 243 sarcomata examined during the same period, only three involved the intestine. He quotes Müller, of Berne, who found during his experience at Berne that of 521 cancers, 41 of the intestine, and of 102 sarcomata there was but one of the gut, the ileum. Smoler in fifteen years (1883 to '98) out of 13,036 autopsies found 13 cases of primary sarcoma of the small intestine, or one in 1,000 deaths. These statistics show the great rarity of sarcoma of the intestine. With the exception of the rectum, sarcoma of the large intestine is still more rare than that of the small.

Still Libman[6] gives 59 cases of sarcoma of the small intestine; Jopson and White[6] have collected 22 cases of sarcoma of large intestine; Nothnagel reports 12 cases, Smoler[7] 13, Treves[8] 18, R. H. Harte[9] one case five years of age, and E. A. Robertson[10] has recorded a case of intestinal sarcoma in a child of four near the ileocecal valve.

With reference to the involvement of the different portions of the bowel the reports are not very complete. DeBovis[11] *(Revue de Chirurgie* 1900, Nos. 6 and 12.) gives carcinomata of the small gut 6.3 per cent., sigmoid 11.9 per cent., colon 20.4 per cent., rectum 49.2 per cent; this would leave 12.2 per cent. for cecum and appendix. Nothnagel's 12 cases of sarcoma show one to involve the duodenum, three the jejunum, four the ileum, three the cecum and one the rectum. Smoler's cases show seven in the ileum, three in the ileum and jejunum, and two in the cecum. The writers are all agreed that carcinoma attacks the large bowel with much greater frequency than the small, while sarcoma selects the small intestine and rarely involves the large gut. The appendix is also the seat of both carcinoma and sarcoma, although it occurs very rarely and is usually not recognized as a primary lesion, except by the microscope after the removal or autopsy.

E. Hurdon[12] reports (*Johns Hopkins Bulletin*, August, 1900) a case of primary carcinoma of the appendix, and mentions ten cases in literature of which only the three cases in which diagnosis had been made by the microscope, could be accepted.

Jessup[12] reports a case of carcinoma of the appendix and has collected 13 cases. Gifford[13] has noted a case of primary sarcoma of the appendix. A. V. Moschcowitz[14] presented a paper upon the subject of primary cancer of the appendix to the New York Academy of Medicine, March 5, 1903, and has studied the clinical picture from 16 reported cases, the majority of which, he says were reported after 1896. Dr. Weir, in discussion, reported a case of this condition which came under his observation in 1893 (See *Record* May 23, 1903). H. D. Rolleston[15] (*Lancet*, July 7, 1900) reports a case of primary carcinoma of the appendix occurring in a woman

Fig. 1.

Case I.—Dorsal surface of cecum showing site of fistula where carcinoma had ulcerated through gut.

aged twenty-six years. F. R. C. Whipham[16] (*Lancet*, February 2, 1901), reports a case of primary carcinoma of the appendix. Arthur W. Elting[17] reported to the Medical Society of the State of New York, January 28, 1903, three cases of primary carcinoma of the appendix which he had studied, and 40 cases, including his own, which he had collected from literature. He says that the condition was probably more common than would appear from the record, for in several cases the carcinoma had been only accidentally discovered at autopsy, so that many cases were doubtless overlooked. The disease showed a tendency to develop early but the symptomatology was exceedingly vague.

Men are more subject to carcinoma of the intestine than women. DeBovis gives proportion as 53.9 per cent. males, 46.1 per cent. females, 85 operative cases collected by Cumston and Vanderveer[18] give 63.83 per cent. as the percentage of males. The series of DeBovis is larger and it is probable that his percentage is more accurate.

Sarcoma as shown by Jopson and White in 22 cases involving the large bowel attacks both sexes with about the same frequency; of these, twelve were males and ten females.

Age.—Intestinal carcinoma, according to the DeBovis collection is most frequent from forty to sixty years. In 35 cases occurring from eleven to thirty years, 23 were in females. In 66 cases in the collection of Cumston and Vanderveer, the average is forty-two years—the youngest being nineteen and the oldest sixty-seven years, only eight are under thirty years. The ages of the sarcoma cases range from two to sixty-six years in Jopson and White's statistics, seven were under ten while only three were past forty years.

The variety of carcinoma most frequently met is perhaps the adenocarcinoma, although this point is not covered in many of the reports. Spheroidal-celled carcinoma either of the scirrhus or medullary type is also found. Squamous-celled carcinoma is rarely present except in the rectum, where it springs from the tissues near the anus. Colloid change is observed in some of the cases. The sarcomata most often assume the round-celled type. Fifty per cent. of the cases of Jopson and White were of this variety, 45 per cent. were lymphosarcomata and only five per cent. or one case, was of the spindle-celled variety. The adenocarcinomata rarely cause circular occlusion of the intestine, but this is the usual termination in scirrhus. Any form of malignant disease by infiltrating and matting the intestines together may interfere with the fecal flow.

Two cases of sarcoma are recorded in which a dilatation of the caliber of the intestine occurred. Ewald[19] mentions a case reported by Bessel-Hagen of a seven-year-old boy, in whom, during the course of an extensive sarcomatous infiltration of the jejunum, there had formed an aneurismlike dilatation of the size of a large man's fist. Jopson and White mention a similar condition in their case.

Not infrequently inflammation attacks the tissues around a malignant growth, and this is especially true in cases in which ulceration has begun. This was a prominent feature in my first case and from the number of reported cases simulating appendicitis, I conclude that it has occurred in some of these as well. A lymph-node taken from my case showed inflammatory changes but no cancerous infiltration. Metastasis from carcinoma of the gut seems to occur most often through the blood and the liver frequently suffers from secondary deposits.

Sarcoma, on the other hand, according to Jopson and White in 68.4 per cent. of the cases shows secondary involvement of the mesenteric glands, 26.3 per cent. of the peritoneum, 10.5 per cent. of the lung, 10.5 per cent. of the kidney, 10.5 per cent. of the spleen, 15.7 per cent. of the liver and 10.5 per cent. of other glands.

Tuberculosis is noted as a complication of cancer in a few cases. Invagination is a very frequent accompaniment of this condition in at least ten per cent. of the reported cases.

The cause of these growths is as little understood as that of cancer in any locality, and it is beyond the scope of this article to enter extensively into the discussion of the various theories offered to account for the abnormal cell growth which results in the production of these neoplasms. Among the various theories may be mentioned those of Cohnheim, Ribbert, and many others based on histogenesis. The questions of diet, heredity, traumatism and irritation have been well considered. The trend of recent opinion has been toward the parasitic explanation, the experiments of Schiller, Gaylord and others leading to this view, while the researches of the Harvard Cancer Commissions seem to disprove the claims that a parasite is the causative agent.

Personally, I incline to the parasitic explanation as the best so far offered, it having some weighty arguments in its favor, but consider it by no means proven.

The usual point of origin of these growths cannot be established from the present literature upon the subject. A frequent site is the follicles of Lieberkühn. Undoubtedly the primany carcinomatous growths must spring from the mucous membrane or its glands, and this view is borne out by the reported cases of carcinoma of the appendix, where the disease has been detected at its inception.

The following statements in support of this view are made in connection with H. D. Rolleston's case: "The facts that the growth was most extensive in the mucous coat, that it could be traced into the muscular coats, and that there was no growth in the peritoneum, showed that it originated in the mucous membrane of the appendix and was not a secondary growth, either implanted in the peritoneum or arising as a result of embolism within its substance."

Whipham's case also had its origin in the mucous coat. Jopson and White say that the point of origin in sarcomatous tumors is rather difficult to locate on account of the size of the tumor and the involvement of the bowel, when the subject presents itself to the operator or to the pathologist; but from the data of the microscopical examination of the tumors which they have been able to collect, and from the careful examination of their own cases, it seems to them that the mucosa is the starting point of these tumors and from the normal histology of the intestine, it will be the origin, if we take it for granted that they have their origin in the lymph follicles. The symptoms of either form of cancer affecting the intestine are very obscure, especially in the earlier stages when interference might offer some hope.

Some irregularity of the bowels may early be present but as a rule this is not of sufficient moment to demand attention. After a time uneasiness, discomfort or actual pain in the abdomen appears; owing to the gaseous accumulation this pain is often colicky in character, it is general over the whole abdomen at first, later it may become localized over the seat of the lesion and is often increased on motion. Although present in the majority of cases, the condition may exist for a long time before any appreciable pain is noticed. As the disease progresses tenderness will accompany the pain. If invagination develops as it does in some cases, the pain will become acute and the symptoms of that condition will be added.

Loss of flesh and strength is marked and progressive, greatly out of proportion to the discomfort of the patient, even when the appetite is good and the digestion appears to be normal. Any derangement of the digestion tends to accentuate the loss of strength, and nausea and vomiting may occur, especially if any tendency to constriction of the intestine is present.

Alternating constipation and diarrhea are often observed, being probably due to constriction of the gut, with impaction which after a time excites a diarrhea. When ulceration takes place the diarrhea may become continuous and prove very intractable, even exhausting the patient so that death results. Hemorrhage from the intestine does not often occur, in fact less frequently than we would naturally expect. It is most common in rectal cancers.

Many cases give a history resembling recurrent appendicitis, especially when involving the ileocecal coil; attacks of pain lasting a few days or weeks with tenderness, nausea, perhaps vomiting, tumefaction in some cases, and a slight elevation of temperature, with relief by treatment followed by a recurrence after a few weeks or months, are quite likely to be diagnosed as appendicitis.

My first case presented just such a history and other writers have mentioned this resemblance, notably Spellissy[20] who mentions cases reported by Janeway, Mühsam, Coley and McCosh, and C. N. Dowd[21] reports a case of annular carcinoma of the cecum which followed the usual course of a slowly progressive appendicitis. Eugene Smith also reports a case that had previously been mistaken for appendicitis. In Cumston and Vanderveer's collection eight cases simulated appendicitis, those of Caird, Mayo (2), Bernays, Lockwood, DeLaunay, Pilcher and Vanderveer. Libman reports five cases of sarcoma giving such symptoms.

The most constant symptoms of the disease are tumor which appears in every case lasting for any length of time, and a cachexia which gives this skin a peculiar yellowish cast. Anemia soon becomes marked and the patient is more and more debilitated until he dies of exhaustion, unless obstruction occurs and makes a rapid end of the case. Sometimes, however, the usual symptoms may be absent, and the first indication of the disease be the development of an intestinal obstruction in a supposedly healthy man. An interesting feature of two of the reported cases is the presence of tuberculosis with cancer.

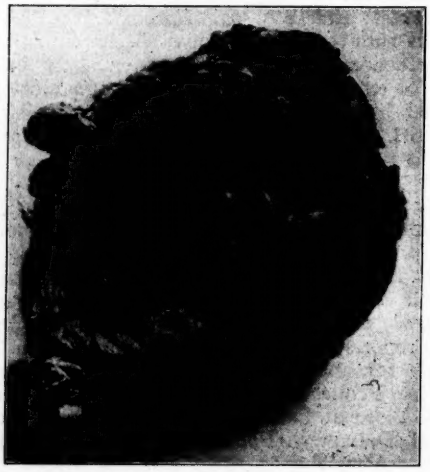
The duration of the disease is very uncertain, death has occurred in some cases in ten days after the first symptoms were noted while others have had symptoms for ten years.

The prognosis is very grave. Unfortunately treatment is usually applied so late that the results are not flattering. Therefore, an early diagnosis and operation will give these unfortunates the best chance, and we should not lose sight of the fact that such conditions are present with some degree of frequency.

Owing to the vague symptoms the diagnosis must largely be made by exclusion. Pain, tenderness, irregular diarrhea, alternating with constipation, dyspeptic symptoms, rapid loss of flesh and strength, even with good digestion, anemia, and cachexia, with an abdominal tumor will make the diagnosis. In the absence of tumor or some of the other symptoms an exploration is justifiable and may often be productive of great good.

Holländer and Löser[22] consider the formation of angiomata of the skin as suggestive of cancer, but this is probably of small diagnostic value, as is the enlargement of the cervical lymphatic glands mentioned by C. Tarchetti.[23] These glands are anatomically so remote from the intestines that they are unlikely to be involved until very late in this disease. The similarity between

Fig. 2.



Case I.—Anterior surface showing colon open and growth within.

appendicitis and intestinal cancer should call for special attention to this point in diagnosis.

The age of the patient is important, especially in making a differentiation between sarcoma and carcinoma. The rapidity of the growth is also important in this connection. Failing by the usual means of reaching a conclusion exploration is clearly indicated.

The treatment is to be largely determined by the extent of involvement. Resection of the intestine and extirpation of the growth offers the only hope of a permanent cure, and this chance though slight should be given the patient whenever practicable, as early in the course of the disease as possible.

Any of the classic methods may be employed. When this procedure is unsafe a fecal fistula may be established to relieve obstruction if present, or to remove irritation from the passage of feces over the diseased tissue. In some cases short circuiting of the diseased intestine by an anastomosis may be practiced with benefit; when the involvement is too extensive to permit operation, palliation is practically all that can be done, as visceral cancer has not responded to the Coley fluid, the X-rays, or to the injection of cancroin of Adamkiewicz.

Case I.—Patient, a white woman of twenty-six years, giving a history of repeated attacks of

Fig. 3.

Specimen from Case II.

what was thought to be appendicitis, came to operation February 17, 1903. At that time she presented a painful tender mass in the right iliac region accompanied by nausea, fever, and a rapid pulse. The abdominal wall was quite rigid. Upon opening the abdomen the mass was found to consist of the cecum and ascending colon which were matted together on their outer side. The peritoneum over this mass was thickened and the tissues around showed evidence of inflammatory changes, while the mesenteric glands were enlarged. Posteriorly a small abscess was found, which communicated with the lumen of the gut through a fistulous tract which had formed as a result of the ulceration of the neoplasm.

The growth extended through the wall of the cecum and colon, firmly uniting them. It appeared inside of the intestine as an irregular elevation about two inches in diameter, and quite firm in consistency. The small gut was not involved, the appendix was normal, and no other growth was discovered in the abdomen. A resection was the only thing possible under the circumstances and this was done by end-to-end suture, the dilatation of the ileum making this procedure comparatively easy. The patient rallied poorly and died 18 hours later from exhaus-

tion due to shock and sepsis. A microscopic examination showed the growth to be an adenocarcinoma. The mesenteric glands presented evidences of inflammation, but were free from malignant involvement.

Case II.—Man, white, age fifty-four years, came to me May 15, 1903, for relief from a fecal fistula which had persisted since the previous September. The fistula, according to his report, followed an operation done at that time for an abdominal trouble causing pain and fever. I found him very anemic, thin and feeble. Examination revealed a fistulous opening at a point half-way between Poupart's ligament and the margin of the ribs, and just external to the outer margin of the right rectus muscle. This fistula was surrounded by a nodular mass about the size of a small melon, which also involved the adjacent skin and muscular tissue. The mass could be isolated from the deeper tissues of the abdomen. A diagnosis of malignancy was very readily made and the patient fully informed of the gravity of the condition, and the slight probability of permanent benefit.

On May 16, 1903, this mass, which consisted of the cecum and ascending colon, a mass of omentum, a foot of ileum, and part of the abdominal wall, was removed and the ileum sutured to the transverse colon. The patient made a good recovery, but from the last report it is probable that he has a recurrence. The neoplasm was made up of a number of gelatinous nodules varying in size from that of a pea to that of an egg. These nodules looked like clumps of grains of cooked sago or rice, but were almost colorless or a pale grayish white, were very friable, readily separated from the mass and had very little vascular connection. One of these nodules was attached to the base of the appendix, which was distended at each end and constricted in the middle, and a number of isolated ones were removed from the peritoneum beneath the liver and on the posterior surface of the stomach. The microscopic examination showed the growth to be a cylindrical-celled carcinoma undergoing a mucoid or colloid change.

Sections taken from (*A*), the opening of the fistulous tract in the abdominal wall; (*B*), the body of the growth about the gut; and (*C*), one of the gelatinous nodules.

(*A*)—The histological findings at this point show the skin of the abdomen very much thickened, particularly the stratum Malphagii. The papillæ are irregular in size and shape, but there is no invasion of the subcutaneous tissue by the epidermal cells.

The connective tissue is infiltrated by small round cells.

The edges of the sections including the wall of the fistula shows an adenomatous growth composed of irregular branching tubules lined by several layers of columnar cells, irregular in size and shape, with nuclei staining lightly in some and deeply in others.

The general appearance of the glandular structure is not that of the intestine but more like the utricular glands of the uterus. As we go out into the tissue around the fistula these glands become dilated and filled with a homogeneous substance taking on a blue tint with the hematoxylin stain. In some the walls are still lined with columnar cells; in others the cells are separated from the reticulum of connective tissue, and lie in the center of the space surrounded by the homogeneous substances in which is imbedded remnants of cells. As we get further away from the fistulous tract the adenomatous structure is entirely lost, and there is seen only the reticulum filled with homogeneous substance. The cells on the alveoli, where they are found in the center, show various degrees of mucoid degeneration.

(*B*).—The section from the body of the growth shows the same histological picture, with the exception that the more typical adenomatous structure is not seen, only the dilated alveoli as described above.

(*C*).—In the gelatinous nodules there is a thin capsule of connective tissue throwing off trabeculæ throughout the nodule forming irregular alveoli, none of which are lined by cells, but some are filled with the homogeneous substance alone and others have cells surrounded by this substance.[24]

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FRACTURE OF THE BASE OF THE SKULL AS A CAUSE OF EPILEPSY: REPORT OF CASE.

BY CHARLES J. ALDRICH, M.D.,

OF CLEVELAND, OHIO;

LECTURER ON CLINICAL NEUROLOGY AND ANATOMY OF THE NERVOUS SYSTEM, COLLEGE OF PHYSICIANS AND SURGEONS, CLEVELAND; NEUROLOGIST TO THE CLEVELAND GENERAL HOSPITAL AND DISPENSARY; NEUROLOGIST TO THE CITY HOSPITAL.

THE following case of epilepsy, occurring in a magnificently developed and apparently healthy man, eleven years after a fracture of the base of the skull, is thought worthy of record. It is especially noteworthy, since epilepsy resulting from fracture of the base is indeed rare.

The case to be related also shows that the subject is entirely free from morbid hereditary predisposition. Moreover, he is remarkably without evidences of degeneracy; and is not only posi-

tively free from specific taint, but his epilepsy has developed beyond the so-called epileptic age. A casual search of the literature reveals but one other well-authenticated case of epilepsy caused by fracture of the base of the skull.[1] It is possible, however, that the absence of such observations is the result of one of those peculiar literary oversights which are not uncommon in medical literature, and when attention is once directed to the question, the report of other cases may follow.

These two cases, however, convince me that the statement of Pearce Bailey, "that fracture of the base does not appear in the causation of epilepsy,"[2] is unwarranted. In view of the fact that Dr. Bailey edited Golebiewski's *Atlas and Epitome of Diseases Caused by Accidents,* in which the other case mentioned is not only referred to but its history given, we would scarcely expect him to have made the former statement, nor to be the author of the following: "As convulsions play so minor a rôle in the acute symptoms of fracture at the base, we would hardly expect epilepsy to be a consequence of that injury, and it does not seem to be one."[3]

One cause for my belief that epilepsy results from fracture of the base more frequently than has heretofore been thought, resides in the curious fact that Bailey is the only authority, whom I can recall, who has published a study of the question, and is the author of specific statements in reference thereto.

The search of the literature which I have made establishes the fact that epilepsy is an infrequent sequel of basal fracture. The cause of this infrequency is probably owing to the fact that when the base is fractured the contiguous brain structures are the ones most likely to suffer. These are not structures whose injury is liable to result in convulsive disease, and fractures of the base where the lesions are severe, extending to the convexity, usually result in death.

The important fact that basal structures, even the basal cortex, do not seem to possess the convulsive elements of the convexity, is undoubtedly the explanation of the relative infrequency of epilepsy as a consequent or remote result of basal fracture. Yet from our knowledge of the irritating effects which may arise from injury to any portion of the brain, we are prepared to believe that cerebral injury wherever located may, in after years, result in epilepsy. Concussion of the brain, particularly in early life, is recognized as a not uncommon cause of epilepsy. Fracture of the base is an accident that usually occurs in adult life. It certainly cannot take place without concussion of the brain, and recognizing that concussion of the brain in the adult may produce epilepsy, we must, if we follow a logical course of reasoning, believe that fracture of the base will be far more liable to produce epilepsy than concussion alone.

The following case, which furnishes the text for this article, was observed through the courtesy of Dr. L. J. Smith, of Cleveland, Ohio: W. R., aged thirty-two years; occupation, polisher; married, and the father of two healthy children. His wife is healthy and has never had any miscarriages or stillbirths. His family history is exceptionally good. His father and mother are both living and in good health; there is no history of nervous taint or alcoholism either in the immediate or fairly remote branches of the family. He had but one brother, who was healthy, but died at the age of seventeen years of typhoid fever. His personal history reveals the fact that he never had need of a physician until his injury. I can also testify to this as a matter of personal knowledge, since I knew him as a healthy child and young adult. At the age of eighteen years he fell into the hold of a vessel, a distance of 12 feet, striking squarely upon his feet. He was picked up unconscious, when it was found that he was bleeding from the mouth, nose, and left ear. The vessel on which he was sailing "put into" Toledo, Ohio, and he was taken to St. Vincent's Hospital, where it was stated that he had suffered a fracture of the base of the skull. There were no marks or contusions on the body, thus rendering it certain that he struck squarely on his feet. At this time he weighed about 160 pounds. For a period of four weeks following his injury he was completely unconscious and at times quite delirious. After the disappearance of his delirium and unconsciousness, his mind appeared to be a perfect blank. He had forgotten everything, including his own name. His parents brought him to his home in Lorain, Ohio, where he was compelled to relearn practically everything. His speech was markedly affected; the character of this speech disturbance I have been unable to ascertain definitely.

He returned to sailing eight months after his injury, but did not appear to fully regain his faculties for over a year; in fact, some of his friends insist that he never has been quite the same since his injury. One year following his injury the captain of the vessel on which he was the mate states that he had some sort of a "spell" at night, in which he jerked and twitched and was unconscious. Eleven years later, in June 1899, he had what was then supposed to be his first epilepsy; but his friend the captain recently recalled the undoubted epilepsy which he suffered one year following the injury. In this last attack he bit his tongue and frothed at the mouth, presenting all of the classical characteristics of a major epileptic seizure.

In the same year, December 4, and again December 28, he suffered a severe convulsion. The following year he had one in February and one in December. In 1901 he had five convulsions. No minor seizures were observed except when he was taking the bromides.

His attack is not preceded by aura. His wife states that he appears to be irritable for several days preceding his epilepsy, and that during the seizure his eyes are turned to the right and upward. The face is also turned to the right with the chin over the right shoulder. The body is

then twisted around following, as it were, the eyes and head. This entrance into the tonic stage is usually without cry. The clonic spasms appear quickly, and are severe. After recovery from his attack he suffers only from general weakness and numbness, neither of which is localized.

Examination.—Patient is a large, handsome, blue-eyed man, weighing 190 pounds and is as perfect a type of physical manhood as one would wish to see. His head is large and well-shaped. He presents as few marks of physical degeneracy as any man I have ever examined. He is keenly intelligent, does not use either alcohol or tobacco, and is an artist of no mean pretensions. He possesses all of the attributes of a well-balanced man, both physically and mentally. His heart, lungs, and abdominal organs are perfectly healthy. The special senses are normal. He has never suffered from headache or dizziness except as a result of a recent attack. The deep reflexes are equal and perhaps slightly exaggerated; no ankle clonus, no jaw-jerk. His pupils are equal and symmetrical, and react promptly and normally to light and accommodation; palpebral apertures are equal; there is some nystagmoid twitching of the eyes while looking to the extreme right or left. The right disk appears to be slightly congested. The right angle of the mouth is somewhat lower than the left, and that side of the face appears to be slightly relaxed; when he whistles it is out of the left side, although by effort he can pucker the lips so as to whistle from the center of the mouth. The labionasal folds are equal. The labiomental crease is slightly deeper on the left than on the right side. There is no other evidence of paralysis, nor can I elicit any history of such disability.

In conclusion, it may be of interest to quote the brief report of the case of Golebiewski: A painter, twenty-nine years of age, who had frequently suffered from lead-poisoning, fell from a height of twenty-five feet on April 30, 1889. Lesion: fracture of the base of the skull with paralysis of the left arm. The patient was treated for one month in the hospital and for another month in the dispensary. He then resumed work. On September 4, 1889, he was again examined with reference to insurance, because of headache and dizziness. On November 11, 1889, he felt entirely well, and resumed work. He was then considered to be fully capable of self-support. On March 16, 1895, he suffered an epileptic attack, which was repeated at intervals. The connection between the accident and the epilepsy was proved, and he was allowed 100 per cent. insurance.

REFERENCES.

1. Golebiewski. Atlas and Epitome of Diseases Caused by Accidents; Authorized Edition by Pearce Bailey, M.D., Philadelphia, 1900, p. 114.
2. Pearce Bailey. MEDICAL NEWS, May 16, 1903, p. 920.
3. Pearce Bailey. MEDICAL NEWS, May 16, 1903, p. 924.

New Italian Hospital.—A hospital to provide for the wants of the Italian section of Philadelphia is to be established at Tenth and Christian streets. It is to be known as the Fabiana Italian Hospital.

MEDICAL PROGRESS.

MEDICINE.

Etiology of Chronic Habitual Constipation.—H. LOHRISCH (Deutsch. Arch. f. klin. Med., Vol. 79, Nos. 5 and 6) explains the cause of many cases of chronic constipation as follows: An excessive absorption of the ingested food goes on in the intestines whereby the amount of dry residue in the feces is considerably diminished in the feces. The intestinal bacteria will find their culture medium deficient in nutritive principles and will not readily propagate so that much less indol, skatol, etc., are formed than under normal conditions. As these substances have the important physiological function of stimulating the intestinal musculature, less active contraction will occur where they are produced only in small amounts. It follows that in most cases of constipation the intestinal musculature may be in perfectly normal condition.

Infection of the Skin in Typhoid.—A mild type of furunculosis is very often observed in typhoid fever patients. A more severe type localized about the sacrum and buttocks was observed by D. L. EDSALL (Univ. Penn. Med. Bull., March, 1904) in the wards of the hospital and which was apparently transmitted from patient to patient. The eruption began as a vesicular one and rapidly spread, becoming pustular. It did not seem to have any marked effect on the general condition of the patients. Cultures showed the presence of the *Staphylococcus aureus*. From the standpoint of the general clinician the chief interest in this series of cases lies in its relation to ward hygiene, and especially to certain details in nursing. In this case the infection was probably carried by attendants and utensils and when the proper precautions were adopted, the infection was checked. The infection here was evidently more virulent than that of ordinary furunculosis and during typhoid, patients are perhaps more liable to cutaneous infections than at other times.

Hydatid Cysts in Lungs and Heart.—The rarity of this condition makes the following case of interest, especially as it closely simulated pulmonary tuberculosis. R. H. QUILL (Jour. Royal Army Med. Corps, April, 1904) reports the case with symptoms resembling phthisis pulmonalis. There was an almost complete absence, however, of the physical signs of that disease. Under hospital treatment the patient improved, but one evening was suddenly seized with intense dyspnea and went into collapse, which proved fatal. Autopsy showed numerous hydatid cysts in both lungs and in the right ventricle. In the latter were a number of loose cysts, one of which had evidently blocked the pulmonary artery and caused death. All the other organs were free. The case is a remarkable one. The origin of the infection was unknown—the patient had not been away from England and his previous health had been good.

Prognosis in Typhoid Fever.—The sudden appearance of one or other serious complication in what seems a mild and favorable case of typhoid fever, makes it necessary to always give a guarded prognosis. And to determine in what manner many of the different symptoms and complications are to be regarded, R. E. SEDGWICK (Birmingh. Med. Rev., Feb., 1904) has made a study of 460 cases. His conclusions are: (1) Mild cases are commonest in the young, fatal complications likely in the old, therefore the younger the patient the more favorable the prognosis. (2) If onset is gradual, the case is likely to be mild; if onset is sudden, the case may be severe. (3) The amount of fever alone is not an important factor. (4) Sudden changes in the pulse suggest complications. (5) Early nervous symptoms indicate either a severe attack or lack of resist-

ance on the part of the patient. (6) Constipation is more favorable than diarrhea, and meteorism is unfavorable as it facilitates perforation. (7) Hemorrhage occurs chiefly in serious cases and the earlier it occurs the more serious it is. (8) Most of the complications tend to recovery; the most fatal being perforation, peritonitis and pneumonia. Among the complications were 24 cases of phlebitis, three of parotitis, three of tibial periostitis, one of periostitis of the sixth rib, one of arthritis of the shoulder, two of pleurisy with effusion, two of neuritis, one of necrosis of laryngeal cartilage with permanent tracheal opening. All of these recovered. One case occurred in a patient with Bright's disease, one with diabetes, and one with active pulmonary tuberculosis, but in none of these cases was the primary disease made worse by the typhoid. The case of tuberculosis was complicated by thrombosis of the left femoral vein, but recovered and actually gained weight during convalescence. Albuminous urine was found in 75 per cent. but had no relation to the severity of the disease.

Cardiac Dulness in Gastric Carcinoma.—Clinicians are still groping for the early signs and symptoms of this condition. W. GORDON (Lancet, April 9, 1904) believes that he has found a sign which, while not invariably accurate, seems to be present with sufficient constancy to render its recognition important. In conclusion, he states that great reduction or obliteration of the normal cardiac dulness is common in cases of carcinoma of the alimentary canal. This loss of cardiac dulness does not appear in the very earliest stages, but may precede cachexia and loss of weight. It is rarely observed in non-malignant cases, but rarely absent in the later stages. It does not seem to occur in cases of sarcomatosis. In doubtful cases, its presence is suggestive of carcinoma, its absence is slightly suggestive of the absence of carcinoma, if the symptoms under consideration have lasted for several months.

Iodide of Potassium in Lobar Pneumonia.—So very few specific remedies are at hand for disease that the claim which is urged for iodide of potassium as being practically a positive cure for pneumonia certainly deserves close investigation. H. ALTSCHUL (Med. Rec., March 26, 1904), during the past two years has treated 62 cases by this method without a death and over three times that number have been treated by his colleagues with similar results. The fact that he has given from 500 to 3,000 grains of this drug per day to these patients without untoward symptoms would certainly seem to indicate that the disease at least causes a special tolerance of the drug. In pointing out the applicability of this remedy to pneumonia he mentions the following important conditions which demand attention: (1) The toxemia; (2) the diminished respiratory surface of the lung; (3) the relative hypoleucocytosis with reduced alkalinity and increased viscosity of the blood; (4) the venous engorgement and laboring heart with a tendency to distention of the right heart; (5) the impaired action of the kidneys and glands; (6) the pyrexia and (7) the cough. He cites numerous authorities to show that when the iodides are given in these large doses there is a marked secretion of free iodide from the mucous membranes and that this has a marked germicidal effect upon the pneumococcus. A marked hyperleucocytosis is always considered a favorable sign in pneumonia and a hypoleucocytosis almost invariably means a fatal termination. The greatly increased activity of the lymphatic system and the great glands, following the use of the iodide of potassium is well recognized and is believed to assist in some degree in the causation of a hyperleucocytosis. Diminished alkalinity of the blood is believed by many to be an important factor in lessening the resisting power of the human body and this condition has been frequently demonstrated in severe cases of pneumonia and typhoid fever. For the purpose of alkalinizing the blood we know of no agent so effective as the potassium salts. Another important action of potassium iodide is its power to reduce arterial tension and thus relieve the burdens of the heart. The viscosity of the blood is also believed to be decreased, diuresis and diaphoresis increased. In analyzing the effect which this drug has upon the course of pneumonia it was found that in spite of the uniformly good results, the duration of the disease was not diminished and in none of the cases did the disease end by crisis. The temperature remained very moderate and the symptoms were markedly relieved. The potassium salt was used instead of the sodium because of its more rapid absorption and its greater alkalinizing power. When the diagnosis is made a dose of 10 to 15 grains is at once given and increased by 5 to 10 grains every two or three hours until defervescence is well established. However soft the pulse may be, the dosage is kept up, irrespective of the quantity, the only guide to the dosage being the regularity of the heart, and especially the character of the second pulmonic sound. Cardiac stimulants were seldom necessary, but strychnine and whisky were sometimes used. The iodide was given in a fifty per cent. solution with milk. A slight coryza and gastric disturbances appeared in a few cases but soon abated when the drug was still further increased. In a large number of cases from 1,000 to 1,500 grains were given in twenty-four hours without annoyance to the patients and the condition of the heart should be the sole guide to the amount that it is advisable to give.

Value of Leucocyte Counts During the Course of Typhoid Fever.—The value of the total and differential leucocyte count in the diagnosis of typhoid fever is very generally understood now, but the premonitory signs of complications which may be derived from frequent blood examinations do not seem to be fully appreciated. H. A. HIGLEY (Med. Rec., March 26, 1904) reminds the profession that as the disease progresses toward the third and fourth weeks the relative number of mononuclears increases while the polynuclears decrease. If, therefore, frequent counts are made and an increase in the relative number of polynuclears is found, especially if a gradual increase in the total number of leucocytes is also observed, some complication should be strongly suspected. Numerous investigations of this nature have shown that the leucocyte count may arouse one's attention to the possibility of a complication at least twenty-four hours before other signs of a pneumonia, abscess or even perforation have developed. Furthermore, upon the appearance of a temperature late in the disease, a differential and total count is very helpful in deciding between a complication and a relapse.

OBSTETRICS AND GYNECOLOGY.

Tarnier's Principle of Forceps Rotation in Posterior Occiput Positions.—The mere engagement of the head at the inlet with the occiput posterior belongs to the initial stage of labor, says W. R. WILSON (Am. Jour. of Obstet., Jan., 1904). It foretells little of the future of labor and is usually only a temporary position. On the other hand, the fixation of the head in the cavity of the pelvis with the occiput directed to one or the other of the iliac joints means a condition of arrested labor which requires the application of forceps, as favorable delivery cannot usually be accomplished without artificial rotation. Theoretically the ideal application of forceps is that with the blades applied to the sides of the head with the concave borders directed toward the occiput. This latter condition per-

mits flexion to take place within the grasp of the instrument and establishes a parallelism between the longitudinal axis of the head and the long axis of the blades. But in posterior occiput cases there is no such symmetrical application of the forceps. The French writers teach that it is possible, while the head is transverse to apply the forceps to the head with one blade opposite to the sacrum, and the other opposite to the symphysis pubis, the concave border of the blades looking toward the occiput. Such an application will give the operator control of the head and permit him to rotate the occiput still further around until the latter comes under the symphysis. But practically, in the majority of cases, the oblique position of the head, where it can be overcome at all by manual deflection, is only changed temporarily. The classic application of the blades, say in an R.O.P., is equally disadvantageous. In the first place the desirable relation of the blades to the head is lacking. Secondly, owing to the imperfect flexion of the head in these cases, the forceps naturally grasp the sides of the head in a vertical direction with the points of the blades infringing upon the submastoid regions, thus increasing the danger to the child. Therefore, it would appear that practically the application in the transverse diameter is the most feasible—grasping the head in one or the other of the oblique diameters running between the frontal and parietal regions, according to the position of the head in the pelvis. Often the child's safety depends upon the rapidity with which the rotation is performed. Rotation may be delayed in difficult cases, owing to absence of molding and flexion. The head can by artificial rotation be carried out of its oblique position as it passes the bony outlet, and the mothers' interests are most favorably guarded. The vaginal wall may easily be caught by the edge of the blade and lacerated, or by forcibly twisting the blades the vagina may be drawn from its connective tissue base with a resulting separation of the surrounding muscles from their fascial attachments. A violation of the principles of rotation, as shown by Tarnier, means serious injury to the mother's soft parts. If rotation were attempted without regard to the principles, about to be described, the unhappy dilemma would arise of either injuring the pelvic floor by traction upon the widely separated blades in an oblique application to the head in an immovable position, or of injuring the vagina by improper rotation of the blades within it. The handles should be rotated in such a way as to permit the ends of the handles to describe a wide circle of revolution, leaving the tips of the blades as a fixed point. This procedure may be simplified by pressing the ends toward the side of the pelvis in a direction toward which the presenting part is to rotate without attempting to rotate the handles. A persistence in this lateral position of the handles will result in a gradual change in their position, yielding to the direction imparted to them by the altered position of the blades. Where such lateral pressure applied to the ends of the handles is apparently not effective, one of three possible influences prevents rotation: (1) The attempt at rotation has been made too early; (2) the head may be too large to undergo rotation; (3) the natural tendency may be for the occiput to rotate posteriorly, or in an opposite direction to that in which artificial rotation is attempted.

Recurrent Fibroids of the Uterus.—The subject of recurrent fibroids has been occupying the attention of gynecologists for some time past, inasmuch as the very nature of the pathology of the growth is not positively known, various observers considering it in different lights. V. S. GROUSDEFF (Roussky Vrach, No. 9, 1904) reports the case of a woman of forty-four years, who entered the hospital with a considerable hemorrhage and severe pain in the lower abdominal region. She was said to have been operated on two years ago. Bimanual examination elicited an enlarged, round immovable and painful uterus. The finger per opened os detects a soft smooth round body, which is easily turned about by the aid of forceps. The discharge is sanguineous with a slight odor of decomposition. Diagnosis of polypus was made; this was removed under chloroform by the aid of scissors and forceps, followed by a curettage of the uterus. Microscopical examination suggested an ordinary submucous uterine fibromyoma. The patient returned in about eleven months with a history of recurrent hemorrhage and pain (she having undergone in the interim another operation for the removal of a polypus) which caused the author to suspect a recurrent fibroid, but as a radical operation could not have been performed on account of the patient's exhausted condition, the growth was again removed and the uterine walls were vaporized. The radical operation (abdominal) was performed two months later. The uterus was freed from the adhesions to the surrounding organs, the vessels were ligated, and the uterus was removed entire. The uterus was greatly enlarged, and, with the enclosed tumor, weighed 1,020 grms. Microscopically the growth turned out to be a sarcoma, and the patient had to be operated on later on for generalized spindle-shaped sarcomata of several abdominal organs with a lethal issue. The question that the author raises is as to whether the growth was primarily a sarcoma or only a fibromyoma which degenerated into a malignant growth. He is inclined to consider it a primary sarcoma. As regards treatment of such cases the radical operation would seem indicated in all the cases of the so-called recurrent fibroids.

Metrorrhagia at Fourteen.—Instances of severe metrorrhagia in adolescents, at or about the commencement of menstruation are quite rare. The following case came under the observation of W. K. WALLS (Brit. Jour. of Obst., Jan., 1904): Hilda P., aged thirteen years and four months had had four "periods" and for three months following these there was almost a continuous copious discharge. Occasionally it would be arrested for a day or a night. Treatment during this period consisted of rest in bed and cold diet. Various medicines were given, mostly of little avail; ergot seemed to increase the amount of discharge. Hot douches had no effect. Vaginal examination showed an enlarged cervix and considerable discharge. The external os was widely dilated, and the uterus antiflexed. Curettage was performed. Apart from these particulars there appeared to be nothing wrong with the uterus. The curetting was followed by gauze plugging, which was removed the next day, and the discharge continued to a slight degree for two weeks. For eight months following this the periods were normal. Though hemophilia is generally at the root of these cases, there was no evidence that it was the cause of the condition in this instance. Dr. Donald, who examined the tissue removed by the curette, found the endometrium characterized by a great amount of interglandular small-celled infiltration; the glands themselves were for the most part rather small, but here and there one or two of unusually large lumen; there was no increase of the vessels. It would appear that this condition resembled that found in metrorrhagia of certain adults and has been styled as "idiopathic endometritis."

Abdominal versus Vaginal Hysterectomy.—The decision whether to perform the ablation by one or the other of these two routes will depend in the early stages upon the particular predilection of the operator. JOHN

B. DEAVER (Am. Jour. of Obst., Jan., 1904) strongly opposes vaginal hysterectomy for cancer of the cervix uteri except in the presence of obstacles necessitating such a course, *i.e.*, a very stout abdomen, nephritis, or old age. The abdominal operation offers an increased space for necessary manipulation, greater security against hemorrhage and less risk of injuring the ureters, one is also better able to keep beyond the area of diseased tissue; a larger portion of the broad ligaments together with their lymph channels can be excised and the individual glandular enlargements noted and removed. Injury to the ureters is not so liable to happen because of the better exposure of these structures. In carcinomata uteri Deaver does not believe that it is necessary to dissect out the iliac glands, as the additional mortality from operation is not repaid by a lessened recurrence. Extension downward into the vaginal epithelium, forward into the bladder and backward into the rectum, is much more common than metastases into the iliac glands. Cancer of the body of the uterus requires complete hysterectomy and in the early stages the organ may be removed through the vagina.

The Beginning of Labor.—In attempting to explain the causes which bring the series of physiological acts that result in the expulsion of the fetus at the end of pregnancy, L. BLUMENREICH (Arch. f. Gyn., Vol. 71, No. 1) was led to make a number of exhaustive animal experiments. He sought especially to determine whether the gravid uterus responds more readily to stimuli than the organ when non-pregnant. In order to rule out spontaneous contractions of the uterus, the experimental animals were placed in a bath of warm saline solution. It was found that in the presence of an excess of carbonic acid or an insufficient supply of oxygen, the uterus of the gravid rabbits reacted much less strongly than that of the non-pregnant animals. The observations of Runge were confirmed, namely that lack of oxygen affords a more powerful stimulus to uterine contraction than an excess of carbonic acid. In not a single instance was it possible to bring on labor by respiration in CO_2. Mechanical irritation affords a much more marked stimulation to the gravid uterus, and moreover meets with a more ready response than in the non-pregnant organ. By means of mechanical irritation alone it was often possible to induce premature labor. These experiments seem to prove quite conclusively that mechanical influences play a much more important rôle in the induction of the labor act, than changes in the gaseous contents of the blood. If this be assumed, the probabilities are strengthened by the fact that these mechanical sources of irritation are increased from day to day by the increase in the volume of the gravid uterus.

The Experimental Production of Hydramnion.—The question of the origin of the liquor amnii still remains a much disputed one. A contribution to its solution is furnished by B. WOLFF (Arch. f. Gyn., Vol. 71, No. 1) in an experimental research on the production of hydramnion. He first determined the normal amount of liquor amnii in rabbits at various periods of pregnancy and found that it increases up to the middle of pregnancy and then decreases in amount. If in a pregnant rabbit both kidneys are removed, it is found that no increase has taken place in the amniotic fluid of those fetuses which are in the first half of pregnancy, but a correspondingly greater increase is noted in nephrectomized animals the nearer full term is approached. In one instance the increase amounted to 21 times the normal quantity, which may with truth be called an artificial hydramnion. This increase cannot be ascribed to any transudation on the part of the mother, as nothing was present in the latter in the nature of an edema or ascites. It seems more likely, in the opinion of the author, that as a result of the extirpation of the kidneys, the urine elements which would otherwise have been excreted by the mother, have been transferred to the fetus and stimulated the kidneys of the latter to correspondingly greater activity. This also explains the fact that no increase takes place in the earlier part of the pregnancy, because here the function of the kidneys has not yet begun. By means of cryoscopic and comparative chemical researches the author hopes to further substantiate these claims.

Ethyl Chloride in Gynecology.—The advantages of this agent as a general anesthetic in this field are commented on by E. E. MONTGOMERY and P. B. BLAND (Jour. Am. Med. Ass'n, April 2, 1904). They claim that it is of especial value for administration to allay pain and relieve muscular spasm in abdominal pelvic examinations. Its employment will frequently permit of an accurate diagnosis in what would otherwise be an obscure case. The short time required for anesthesia, the rapidity with which the patient will recover from its effects, and the decreased tendency to nausea and vomiting, will allow its employment in office practice, with the assurance that the patient can return home without the need of prolonged attention. The same indications will lead to its employment in all operations of a minor character where prolonged anesthesia will not be required. In enfeebled patients requiring vaginal incision for pelvic drainage, it is ideal, for administration need not be begun until everything is prepared for incision, so that the patient will be under its influence only a few minutes. Probably its most effective employment will be as preliminary to the administration of other anesthetics. A nervous woman may be brought under the influence very quickly, without struggling, and convalescence from the final anesthetic is more rapid because she has not undergone any complete saturation with it. The principal disadvantages are that the patient passes under and out of its influence so quickly that the administrator must be unusually expert to avoid, on the one hand, profound anesthesia, and on the other, the emergence from its effects at an important stage of the operative procedure. The expense of the drug also precludes its use in a general clinic.

The Generative Cycle of Woman.—Ovulation with its attending sexual excitement is to the mammal what blossoming is to the plant, an evidence that an embryo seed is ready for impregnation. Among subhuman animals it is confined to distinct seasons and pregnancy and lactation follow always in due course. But in the human female, owing to more complicated conditions of life, pregnancy has not always followed ovulation, therefore ovulation has become more frequent, and menstruation has developed, menstruation being the depletion of a hyperemic, uterine mucous membrane which normally should have received an impregnated ovum. Hence every menstruation is the sign of a disappointed pregnancy, and is, therefore, an abnormal state. Such are the theories advanced by JENNIE G. DRENNAN (Canadian Jour. of Med. and Surg., Jan., 1904), and she holds that if every woman had become pregnant when ovulation took place, as the lower animals do, menstruation would not have developed. But as civilization advanced mating became more difficult, the race more sexually inclined, because more pleasure-seeking, and woman, having less manual labor to perform, directed more attention to her sexual functions. She even, by her artificial life, cut down the period of lactation from the normal two or three years to eight or ten months, because the periodical hyperemia of the ovary began again that soon after pregnancy was completed, and, depriving the breasts of some of their blood-

supply, changed the quality of the milk. Unquestionably the sexual, social and religious life has been closely interwoven, and as mating became a more difficult matter, festivals became more frequent. In more primitive peoples religious feasts were really sexual orgies, and nowadays we find that those who are deprived of sexual relations find an outlet for their energies in various religious or philanthropic enterprises.

Central Paralyses of Pregnancy.—Paralysis during pregnancy of a hysterical nature is less frequent than generally assumed; in most cases R. v. HOSSLIN (Münch. med. Woch., March 8, 1904) found a definite organic basis. Genuine apoplexy is not uncommon immediately before, during and after parturition and is ascribed to hypertrophy of the heart, increased resistance in the vessels of the lower extremity and toxic influences which alter the vessel walls. As a rule the hemorrhage is very large and involves the central ganglia, lateral ventricles and internal capsules, so that the prognosis is very doubtful. The onset is sudden with coma, hemiplegia and paralysis of the facial and hypoglossal nerves. Another form of paralysis depends upon nephritis and is a manifestation of uremia; it generally occurs in primiparæ of advanced years and depends upon a circumscribed edema of the brain or upon hemorrhage. Prodromal symptoms such as headache, nausea, vomiting with or without edema and albuminuria are common and the paralysis generally sets in after one or more eclamptic seizures. On account of the deep coma the paralysis is often overlooked but may manifest itself as hemiplegia, monoplegia, hemianopsia or amaurosis; when dependent on edema it is often transient though the patient may still die after considerable improvement has set in. These cases are often wrongly looked upon as hysterical, since of such short duration. A large percentage of paralyses depends upon thrombosis of the cerebral vessels owing to puerperal infection or severe metorrhagia after birth or miscarriage. The onset is very gradual, consciousness is generally preserved and rapid improvement may follow. Convulsions frequently accompany the paralytic stroke, which is hemiplegic in type. The cause of cerebral embolism may rarely be a thrombus which is carried from a pelvic inflammation or a phlegmasia alba dolens, through an open foramen ovale into the cerebral circulation; in most cases, however, it is an ulcerous endocarditis during the puerperium. It is common for old valvular lesions to recur during pregnancy but endocarditis may also develop during this time, very insidiously with palpitation, dyspnea and a blowing, systolic murmur at the apex. The onset and course of the paralysis are similar to that depending on thrombosis. Rare conditions which cause paralysis are cerebral tumors, puerperal encephalitis, metastatic cerebral abscess after puerperal fever and progressive paralysis. Spinal lesions are of less importance, since most have already existed before and are hardly influenced by pregnancy. There is a distinct connection, however, between the latter and traumatic paraplegia and compression myelitis and occasionally a severe paraplegia will set in after copious hemorrhage. Less frequent conditions are meningomyelitis, spinal apoplexy, encephalomyelitis, acute and subacute polyomyelitis, multiple sclerosis and a chronic form of myelitis running the course of a spastic paraplegia; it is without doubt that any one of these diseases may develop during pregnancy in hitherto healthy women, so that the cause must be ascribed to some autointoxication. Both animal experiments and clinical experiences show that conception is not impossible when severe cerebral or spinal lesions are present. With cerebral disease, pregnancy usually runs its normal course if the life of the mother is not destroyed; with spinal disease, the patient is often unconscious of her condition and pregnancy may be interrupted when the disease sets in suddenly. Even parturition is hardly affected by cerebral paralysis and in the spinal forms the labor pains are usually of normal intensity. In many cases the delivery is easier and more rapid than in normal individuals.

A Rare Case of a Foreign Body in the Vagina.—Foreign bodies are introduced into the vagina with many aims in view—as curative means, for masturbation, for induction of abortion, etc. There are many cases on record of pessaries permitted to remain in the vagina for many years; though usually harmless, they may in some certain cases, induce considerable inconvenience and eventually injuries to the vaginal walls and in the neighboring organs. ORLOFF (Roussky Vrach, No. 11, 1904) reports the case of a woman of sixty years who was admitted to the clinic with pains in the lower abdomen and vagina, dyspnea, cough and purulent discharge from the vagina. After her second child she felt while at her work severe pains in the abdomen and a dragging down sensation, and to obtain relief she introduced into the vagina a croquet ball which she found in the garden. This was thirty years ago. This brought immediate relief, and during all these years there was no disturbance in the functions of either the bladder or the rectum. Examination elicited senile atrophy of the vagina at the introitus and higher up the finger struck a round, hard body. Neither the urethra nor the rectum seemed to any degree compressed. In view of the contracted introitus the foreign body could only be extracted piecemeal. Its substance remained unchanged, fresh and compact. The vaginal walls showed the presence of colpitis and here and there ulcerations. The patient left the clinic completely improved on the fifth day.

Hemorrhages from the Ovary.—The possibility that sufficient hemorrhage may take place from a corpus luteum which has undergone cystic degeneration, to really endanger life has only been proved in isolated cases. O. BURGER (Zeitsch. f. Geb. und Gyn., Vol. 51, No. 2) believes that the case which he reports affords undoubted evidence of the cause of the bleeding and that there is definite symptom-complex which must be reckoned with, by which the condition can be diagnosed in those cases where it is possible to rule out a pregnancy. The patient, a woman of thirty-seven years, married nine years, but had never conceived. The menstrual history was normal and general health good. Her last period did not stop at the usual time but continued for three weeks, in slight amount. During this time she subjected herself to unusual exertion. She was suddenly seized with severe abdominal pains and vomited some blood. On admission to the hospital, a ruptured ectopic was diagnosed and laparotomy done. The abdomen was found full of blood, which apparently came from an ovarian tumor on the left side, the tubes being normal. The patient made a good recovery. The histological examination of the specimen showed a tendency in the ovary to a cystic degeneration of the Graafian follicles, certain of which had assumed considerable size while their walls had been very much thinned out. The presence of some pathological hyperemic condition caused a severe hemorrhage into the cavity which resulted in a rupture of the cyst wall, after which the blood entered the peritoneal cavity. The reason that no hematocele was formed may be explained by the fact that no inflammatory processes were present around the ovary. The continued bleeding during the three weeks may be ascribed to the constant hyperemia brought about by the woman's exertions during her menstrual period. The case is of considerable interest.

Loss of Blood During Labor.—More or less uncertainty still exists as to what shall be considered a normal amount of blood lost during a labor. From statistics relating to over 6,000 labors, F. AHLFELD (Zeitsch. f. Geb. und Gyn., Vol. 51, No. 2) has deduced certain facts which he believes to be of practical value. It was only by the aid of a specially arranged bed that he was able to accurately estimate the exact quantity of blood lost in each case. In the middle of the mattress is an opening, accommodating a funnel which catches the blood and conducts it to a graduate placed under the bed. The blood is separately measured which comes away before the birth of the placenta, that which passes with the placenta, and lastly, that which is voided after the labor proper. Care is taken that the amniotic fluid and urine are carefully excluded. If at any time the amount of blood in the graduate exceeds 400 c.c., the attending physician is at once called. In the author's experience, the placenta is wont to remain in the vagina in the majority of cases, if the patient is not disturbed, from one and a half to two hours, and this he believes is the normal course. In 13 per cent. of cases, where the placenta was delivered spontaneously, a greater amount of blood (673 c.c. on an average) was lost than where the birth of the placenta was delayed. In estimating the influence of previous births on the amount of hemorrhage it was found that the increased amount was due rather to the increasing size of the children and their placentæ than to the number of previous labors. The length of the expulsive period did not seem to have any marked effect on the amount of blood lost. The most bleeding takes place during the first hour after the child is born. In pathological cases the same procedure was attempted, *i.e.*, to wait whenever possible with the expression of the placenta, for about two hours. In over 21 per cent. of the cases this period of waiting could not be adhered to, but the large number remaining shows that only for definite reasons, such as hemorrhage, should the third stage of labor be hastened. The after-effects of this loss of blood on the patient's condition are somewhat a relative matter. In normal, strong individuals, a loss of even 1,000 c.c. may not be followed by any evil consequences. For weak or sick persons no rule can be formulated. Where 1,500 to 2,000 c.c. are lost, it was found that in the majority of cases only slight or moderate degrees of anemia resulted. When the amount lost exceeds these figures, the result depends more or less on the patient's condition and whether the loss is sudden or gradual, four cases being reported where the woman lived even after having lost 3,000 c.c. In considering the after-effects of hemorrhage, the author believes that his statistics show that the danger of puerperal infection is increased in proportion to the amount of blood lost. The mother's ability to nurse does not appear to be very much affected, as about 50 per cent. of the breast-fed children reached their birth weight by the tenth day. It seems from these observations that healthy women can experience a considerable degree of hemorrhage during labor without being seriously influenced.

Gonorrhea in the Puerperium.—There is a considerable divergence of opinion as to the influence of gonorrhea on the puerperal state, some claiming that the disease has very little effect, others that considerable disturbance may be caused. A. MARTIN (Berl. klin. Woch., March 28, 1904) reports 13 cases of chronic gonorrhea which he kept under observation during their labor and puerperium. In none of these cases were any symptoms present which could be attributed directly to the venereal disease. In addition they seem to confirm the assumption that so-called chronic gonorrhea is no barrier to pregnancy, in most instances, even where there is a localization of the disease in the cervix or, as in one of the cases, there is present a gonorrheal salpingitis. In none of these patients did abortion come on. In 12 cases the labors were favorable, in one of which an acute exacerbation of the gonorrhea may have had some influence in hastening the labor by the rise of temperature. In the remaining case, extensive adhesions of the placenta delayed the third stage, but subsequent examination showed that this condition was not due to the gonococci. In four cases the puerperium was practically normal, in the remainder there was a rise of temperature, coming on rather late, and this the author considers a characteristic of gonorrheal infection. Involution moreover did not appear to be interfered with and no perimetritic involvement occurred such as has been noted in the acute cases. Although the author considers that the relation of gonorrhea to pregnancy must still furnish a doubtful prognosis, he does not agree with most authors who assume that it is "ad malem vergens." The treatment should be limited to local douching with normal salt solution, to which antiseptics may be added, but the most satisfactory results were obtained with applications of sterilized yeast both to the cervix and the urethra. Where gonorrhea is recognized as the cause of disease in the adnexa or the uterus, radical operations should be resorted to with caution, and the hope of spontaneous cure should not be abandoned too early. In isolated instances the severity of the complications must necessarily be taken as the guide; and where operation is called for, he considers that evacuation of the pus through the vagina forms the most satisfactory procedure.

Fetal Thyroid Hypertrophy with Maternal Eclampsia.—The following interesting case is reported by W. E. FOTHERGILL (Brit. Jour. of Obst., Jan., 1904): Mrs. D., aged thirty-seven years, a short, stout woman, had had two early abortions and a third pregnancy. In eighteen months she again became pregnant but aborted at the third month. April 14, 1902, she became pregnant for the fifth time. On December 3, 1902, her urine was normal. Her thyroid became enlarged shortly after the inception of the pregnancy. On Dec. 7, she developed edema of hands and feet, and on Dec. 16 her urine contained 0.2 per cent. of albumin. On Dec. 27 she developed headache and vomiting, and later still, all the signs of a typical eclampsia. Under the proper treatment this cleared up; and on Jan. 1 she went into labor. A small female child was easily born; forceps being employed. It cried freely immediately, and some venous distention at the neck at once became visible. After the mother had received attention, the examination of the child revealed the presence of a large, solid tumor, representing the whole of the thyroid gland. This was covered by an enormously dilated venous plexus. The head and neck became more and more intensely congested, and it became clear that the circulation, as demanded by the pulmonary circulation, could not be established. The child died a few minutes later. For twenty-four hours after the completion of the labor there was complete anuria, but the temperature had been quite normal and the pulse-rate 140. Thyroid extract was given to the extent of 30 grains. Two days later the amount of urine voided was about five pints. On January 4 the pulse rate had fallen to 110, with good, large amounts of urine still being passed. During the next few days the patient's condition gradually became normal. The post mortem on the fetus showed the liver to be very large. The enlargement of the spleen appeared to be due to overgrowth of all the tissue elements, especially the glandular elements. Most examples of "congenital goiter" occur in "goiter districts," and in goiterous families. A form of enlargement of the

fetal thyroid may follow the administration of potassium chlorate to the mother under certain circumstances. In many cases of habitual abortion the administration of small doses of potassium chlorate is followed by the extension of pregnancy to its normal limits. Careful examination of the abortive ova expelled by these patients show that death is due to extensive thrombosis within the intervillous space. Large doses of potassium chlorate are well known to produce certain destructive changes in the blood, the therapeutic use of the substance having produced death in this way, especially in children. As to the occurrence of hypertrophy of the fetal thyroid, it may be argued that a toxic state of the maternal blood is to be blamed for this, and for abortions not prevented by the administrations of the potassium chlorate. It may also be argued that the hypertrophy of the thyroid was the direct result of changes in the maternal blood caused by potassium chlorate.

PHYSIOLOGY.

Complete Inversion of Viscera.—In visiting the autopsy room of the hospital M. K. LENTZ (Roussky Vrach, No. 9, 1904) came across the body of a woman of sixty years in whom the following transposition of viscera was found: the entire right lung was found on the left half of the chest, while the left lung was seen in the right chest. The heart was demonstrated on the right half of the chest; its left ventricle to the right and the right one to the left. In correspondence with the position of the ventricles, the aorta and the pulmonary veins issued from the right ventricle, while the pulmonary arteries and the vena cava originated from the left. The arch of the aorta was directed from left to right. From the innominate artery there branched out, instead of the right, the left carotid and subclavian arteries, while the right carotid and subclavian issued directly from the aorta. The descending aorta was placed to the right of the spine. The esophagus was found to the right of the spine. The liver was seen on the left, the spleen to the right, the left lobe of the liver was on the right side, and the right on the left. The stomach was transposed to the left of the median line, but its curvatures were normally situated, namely the large externally and the small internally, it thus seemed as if the stomach had been rotated 180° and then transported to the right half of the body; the gastric opening was found to the right and the pylorus to the left of the spine. The duodenum was turned with its convexity to the left, instead of the right as is normal. The head of the pancreas was found on the right, and its tail to the left, thus its head was toward the liver and its tail toward the spleen as in the normal relation to these organs. The ascending colon and the cecum with the appendix were placed in the left iliac region, with the descending and sigmoid to the right.

The Absorptive Capacities of the Skin.—It has long been thought that the power of many substances to traverse the skin from without inward, is very slight. SCHWENKENBRECHER (Arch. f. Anat. u. Physiol., Feb. 24, 1904) in a long series of experiments on mammals, finds that a large number of substances are readily absorbed by the skin. These are mostly soluble in water and oil and their absorption is dependent upon the osmotic laws that govern the cells in general. The experiments were conducted on white mice by immersing the animals in the respective solutions. The following were readily absorbed: ethyl alcohol in aqueous or oily solution, amyl alcohol, ethyl ether, chloroform, iodoform, iodether, cyanogen compounds, aldehydes (formaldehyde), chloral hydrate, ketones, phenol, lysol, resorcin, guaiacol, creosote, salicylic acid, anilin, antipyrin. As regards the alkaloids, the author found that strychnine nitrate is not absorbed by the normal skin. The same is true of basic strychnine. Nicotine is absorbed. The author cites Bouchut who found narcotic symptoms in children in whose skin opium had been placed, and Kunkel, who speaks of smugglers suffering from the toxic effects of nicotine absorbed from the tobacco hidden next to the skin.

Changes in the Blood after Muscular Exercise.—Healthy young men taking regular physical exercise have a normal blood count of 5,600,000 red blood cells and 8,800 leucocytes per cubic millimeter, the ratio being 1:636, according to P. B. HAWK (Am. Jour. Physiol., March 1, 1904). There is an immediate increase of reds and an accompanying leucocytosis after running, walking, bicycle riding and swimming. The immediate increase of the red cells is inversely proportional to the length of the exercise period. The leucocytosis is inconstant. The maximum average increase of 22.5 per cent. in the number of the red corpuscles is caused by the short swims, the greatest increase being secured after participation in water polo for three minutes. Long bicycle rides produce the minimum average increase of 9.7 per cent. As regards the leucocytes the maximum average increase followed the exertion incident to the long swims. Short swims produced the minimum average increase. The increase in the number of red corpuscles produced by muscular exertion is probably due primarily to the passage into the circulating blood of a large number of cells lying in various parts of the body and inactive before the time of the muscular exercise. The leucocytosis is due to the changed distribution of the leucocytes and their accumulation in the peripheral circulation.

Some Phenomena of Animal Pigmentation.—A field of physiological research, which has been vigorously tilled during the past few years and which promises practical results from the standpoint of the pathology of pigmented neoplasms, is the subject of the formation of animal pigments. R. C. SCHIEDT (Am. Jour. Physiol., March 1, 1904) reports the results of his interesting experiments in this line. He deprived oysters of one of their shells and exposed them to pure light, with the result that the animals secreted pigment over the whole of their body. The chemical or blue rays produce the same pigment, but not so with the red rays, which, however, protect the animal against the pathological changes due to irritation. The pigment is formed in the ectodermal organs of the epidermis, and in the organs of the mesoderm, as the heart it is embodied within the endothelium and connective tissue fibres. On placing the animal in darkness all pigment disappears. The author also finds that pigments produced under pathological conditions are not permanent, thus differing from the pigments formed under physiological influences. The author also believes that pigment granules are excretory products of protoplasm caused by pathogenic conditions, being reabsorbed when the conditions are removed. In this he agrees with Loeb. In the oyster the absence of the protective shell causes special irritation, perhaps a secretion of chromatin by the nucleus, and a restitution in darkness in which the animal is accustomed to dwell. This secretion is probably the result of a chemical process, as shown by the effect of the chemical or blue rays.

Contribution to the Physiology of the Thymus.—An investigation of the physiology of the thymus gland was made by D. N. PATON and A. GOODALL (Jour. of Physiol., March 29, 1904) with interesting results. In guinea-pigs the thymus continues to increase in size till the animal reaches a weight of about 300 grams, or an age of about two months, *i.e.*, at about the time when the animal becomes capable of reproduction, and after

that time it begins to degenerate. Removal of the thymus even on the day of birth has no influence on the growth of the animal. Removal of this organ causes no change in the number or character of the erythrocytes, but is accompanied by a decrease in the number of leucocytes, which, in the animals observed, lasted about two months. All varieties of leucocytes took part in this decrease. Thymusless animals which became pregnant showed a normal leucocytosis. Thymusless animals infected with tubercle showed the same increase or altered proportion of leucocytes as is manifested by animals with the gland intact. The injection of terebene caused a leucocytosis in thymusless as in normal animals. The injection of broth cultures of staphylococci and streptococci did not usually cause the marked leucocytosis in thymusless animals which it produced in normal guinea-pigs. The resistance to the toxins of streptococci and staphylococci is diminished by removal of the thymus, which removal, however, has no effect on the resistance of the animal to diphtheria toxin.

Distribution of Nitrogen in Urine.—The various nitrogenous principles in the urine of healthy individuals were determined by A. LANDAU (Deutsch. Arch. f. klin. Med., Vol. 79, Nos. 5 and 6) as follows: Total nitrogen was estimated according to Kjeldahl. A certain portion of the urine was then precipitated with phosphorvolfromic acid and the nitrogen determined in this precipitate: this corresponded to ammonia, the purin bodies, kreatinin and the pigments. The nitrogen of the filtrate gave the figures for urea and the amino-acids. The urea itself is best determined according to Schöndorff, the purin bodies after Camerer's method and ammonia according to Schlösing. The following average figures were obtained during health: Purin-nitrogen 1.01 per cent., ammonia-nitrogen 2.42 per cent., urea-nitrogen 90.87 per cent., amino-acid-nitrogen 2.89 per cent. The kind of ingested proteid seems to have little influence except that the amino-acids are rather high after meat and low after casein. The amount of amino-acids can also be increased by the ingestion of amino-acids such as asparaginic acid, but not if bicarbonate of soda was given at the same time. The only known amino-acid excreted with the urine is hippuric acid, but probably a number of other similar bodies are voided. Excessive or deficient nourishment seems to have no influence on the distribution of nitrogen in urine.

The Macrophagocytic Reactions of the Human Spleen.—There are present in the spleen, according to E. GAUCKLER (Jour. de Physiol., March 15, 1904), macrophagocytes whose function is that of erythrolysis and leucolysis, which are normal processes of the spleen. Any cause which leads to adulteration of the blood, particularly that which underlies icterus, exaggerates this macrophagocytosis. Beside the splenomegalies of infectious or congestive origin, there are forms attributed to the macrophagocytic reactions. These are the result of the excessive number of the macrophagocytes, or of the hypertrophic sclerosis of the organ induced by the excessive hemolytic reactions. The macrophagocytes produced in the spleen in excess pass by way of the blood-vessels to the liver. The relationship between splenomegaly and hepatitis may be a double one. Either the adulteration of the blood consequent upon a primary lesion of the liver produces hemolytic and sclerotic changes in the spleen, or else the adulteration of the blood is primary, and the secondary lesions in the liver are produced by the macrophagocytes brought there from the spleen.

Chemistry of Proteids.—Owing to their exceedingly complex composition, proteids alone have failed to yield to chemical analysis and much further work is necessary before a probable formula can be given. Some proteids have been very carefully studied so that almost all the molecules which enter into their composition are known; thus edestin yields no less than eighteen. It is, however, impossible to say how these radicals are joined together, whether in the form of an open or closed ring, a chain or both. A. KOSSEL and H. D. DAKIN (Münch. med. Woch., March 29, 1904) have studied a group of proteids known as the protamines which may be looked upon as the least complex of these bodies. By the common analytical methods they can be split up into only five simpler bodies, viz., aminovalerianic acid, a-pyrrolidincarbonic acid, serin, urea and diaminovalerianic acid. The latter two are firmly united as a compound known as arginin. The proteolytic action of ferments is the same as that of hot acids since the same decomposition products result and this holds true for the simple protamines as well as for the more complex albumins of the higher animals. In many organs, however, an exceedingly active ferment, arginase, may be detected, which can do more than acids, even after prolonged action at boiling temperature, since it is able to split arginin readily into its two components. This action is due to the splitting up of an imide group by chemical union with water.

Experimental Toxic Leucocytosis.—A series of experiments to determine the effects produced in the blood of dogs by the intravenous injection of putrid horse serum, the relations existing between body temperature and leucocytosis and how changes in the walls of the blood vessels affected the latter, are published by J. G. SILVERMAN (Univ. Penn. Med. Bull., March, 1904). It was found that the injection of putrid horse serum causes a primary hypoleucocytosis, in which the polymorphonuclear neutrophiles are diminished and the mononuclear elements increased, followed by a secondary hyperleucocytosis which is characterized by (*a*) a great increase in the polymorphonuclear variety; (*b*) an appearance of cells on the border line of myelocytes, as well as an actual presence, in the severe cases of leucocytosis, of mononuclear neutrophyles in small numbers; (*c*) a deficiency in hemoglobin which was found in 60 per cent. of the dogs experimented upon, associated with an appearance of normoblasts in the blood. There is no definite relation between the leucocytosis and the rise of temperature; the grade of the leucocytosis is not proportionate to the height of the temperature, and the maximum rise in one occurs independently of that of the other. Inhalations of amyl nitrite and injections of potassium nitrite cause a primary hyperleucocytosis in a very short time, due probably to the dilatation of the capillaries. Potassium nitrite administered before the injection of peptone lessens the duration and the extent of the disappearance in the number of the leucocytes during the hypoleucocytosis, and thus disproves that the leucocytes are destroyed. These results lead to the belief that the decrease in the number of the leucocytes in the beginning of leucocytosis is due to their obstruction and imprisonment, caused by the narrowing in the lumen of the capillaries, owing to the irritation of the endothelium by foreign toxic substances.

Medical Necrology.—An Austrian statistician finds that the average lease of life of a medical practitioner is sixty years. Deaths due to tuberculosis only amount among them to 7 per cent., thus showing how careful they are in taking precautions against infection. On the other hand, fully 40 per cent. of doctors die of heart disease and nervous collapse.

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THE FUNCTION OF THE EOSINOPHILE.

EVER since Ehrlich's discovery and demonstration of these peculiar white blood cells containing large granules which stain so well with eosin it has been an insistent problem in the minds of pathologists and physiologists as to what the special function of these cells might be. It seems impossible not to conclude that they must have a definite and very specialized purpose seeing that their constitution is apparently so different from that of all the other white blood cells. In a paper read before the meeting of the Association of American Physicians, held in Washington last week (see Society Proceedings in this week's MEDICAL NEWS, page 997), Dr. E. L. Opie, of Baltimore, gave the results of his studies of the relation of cells with eosinophile granulations to bacterial infection which seem to show that these leucocytes play a very important rôle in the matter of vital resistance to bacterial invasion.

Within a few hours at most after virulent infection of an animal in the peritoneal cavity all the eosinophile cells in the peripheral circulation have practically disappeared. With milder and more chronic infections it may take longer for the eosinophiles to disappear, but eventually it becomes very difficult to demonstrate any of them in blood drawn from the surface of the body. On the other hand, if the infection is of a kind to which the animal does not eventually succumb, the eosinophiles begin to make their appearance once more and then increase until they have reached a number twice as great as they were originally. This increase of the eosinophiles is accompanied by a corresponding relief from the symptoms produced by the infection until the animal has completely conquered it. For instance, when guinea-pigs are injected with *Bacillus pyocyaneus* the eosinophiles will be found to have disappeared entirely from the peripheral circulation at the end of twenty-four hours. This form of infection is usually recovered from. With the decrease in the eosinophiles there is an increase of polynuclear leucocytes, but after the twenty-four hours have elapsed the eosinophiles begin to make their appearance once more and on the fifth day they have risen to double the normal number for the animal experimented on.

Under these circumstances the fate of the eosinophiles during their interval of disappearance becomes a very interesting problem, which, however, Dr. Opie seems to have solved completely. When the injections of infectious material are made into the peritoneal cavity the eosinophiles begin at once to accumulate in the blood-vessels of the omentum and the mesentery. Positive chemotaxis is so powerful that even an hour after the injection of virulent infectious material these granulated white cells can be seen adhering to the walls of the veins of the mesentery and can even be detected beginning to migrate through the vessel walls into the surrounding tissues. Here they do not act as phagocytes apparently, certainly not to any very marked degree, though a number of large mononucelar cells can be seen performing phagocytic action. As a matter of fact, alongside these macrophages of Metschnikoff, the eosinophile cells seem to be more or less inactive. Foreign observers reported having seen eosinophile cells when lying in contact with bacteria apparently direct their granular material in a more or less continuous stream toward that pole of the cell near which bacteria lie with the gradual disappearance of their granules. This curious biological phenomenon was supposed to represent some protective action on the part of the eosinophiles, but the observation has not been confirmed.

A very interesting set of observations seems to show that the eosinophiles may, as myelocytes, find their way from the bone marrow through the intervening circulation to the spleen and be re-

tained there for some time, in the meantime multiplying rather freely. This has undoubtedly led to the conclusion that eosinophiles frequently originate in the spleen.

While the eosinophile reaction seems to differ very markedly regarding the reaction of vegetable and animal parasites, for, as is well known, with *Trichina* there is an increase in the number of eosinophiles to be found in the peripheral circulation, Dr. Opie is of the opinion that this difference is more apparent than real and that the eventual increase of the eosinophiles in bacterial invasions which are not fatal shows that these cells, as in the case of infection with animal parasites, play some important rôle in the maintenance of vital resistance against parasites of all kinds.

INFLAMMATION OF THE OMENTUM.

THAT infection is the etiological factor of omental adhesions is probably admitted by all surgeons. In his important experimental work on the subject, Brink comes to the very just conclusion that this is absolutely essential, because he found that simple scarification of the peritoneum was insufficient to produce adhesions between it and the omentum, while if the parts were injected with *Staphylococcus pyogenes* such adhesions always occurred. As still another proof of the part played by infection in the production of omental adhesions, we would point out that when they spontaneously occur, that is to say, without traumatism, operative or otherwise, it is always after some infectious process has taken place in the abdominal cavity.

How does the infection spread? A study of the diseases of the female genital organs, such as metritis, ovaritis, salpingitis brings into prominence the close anatomical relationship of these organs. This relationship also extends to the pelvic peritoneum. A pelvic peritonitis, or rather a torpid attack of pelvic peritonitis, is invariably accompanied by an inflammation of the female genital organs, and although it has been upheld by Treves that the omentum never reaches as far as the pubis, the fact nevertheless remains that in many autopsies and laparotomies the lower border of the omentum is found not only reaching the pubis but it dips down into the pelvic excavation. The omentum, therefore, can readily come in contact with infected pelvic viscera.

This involvement of the omentum in pelvic inflammatory processes has been the subject of both clinical and pathological studies. In 1900 Braun pointed out that a tumefaction of the omentum frequently occurs after its partial resection in the radical operation for hernia and in certain gynecological affections. Inflammation of the omentum reveals its presence by severe abdominal pain, resistance on palpation accompanied by symptoms of intestinal occlusion. Its evolution is either toward resolution, abscess formation or chronicity.

Pathologically, inflammation of the omentum has been more especially observed during operations for appendicitis. The organ is red and presents a granular aspect, due to an excessive vascularization. Small extravasations or little hemorrhagic foci are observed and, not infrequently collections of rosy serum mixed with pus are found, especially among the adhesions. Microscopically one finds the lymphatics gorged with leucocytes.

Such is the acute form, but the process may evolute toward the chronic type and then the omentum retracts, thickens and finally forms a tumor. On examination, the omentum is found hyperemic and in many places a number of white, hard nodules, varying in size can be distinctly felt in its substance. These nodules are foci of subacute inflammation of the organ, which microscopically are found to contain broad bands of adult connective tissue fibers, representing vascular connective tissue of inflammation. Inflamed interstitial cells mixed with a few young connective tissue cells, form small masses situated between the adult connective tissue fibers. Occasionaly the fat lobules have disappeared in these foci and the few fat cells that still exist show evidence of irritation. Their nuclei are multiplying and some cells may contain as many as ten or twelve. The cell itself is diminished in size.

In other instances the fat lobules exist in quantities, so much so that they may form true lipomata.

The endothelial structures become hypertrophied while in places blood pigment is found indicating a former hemorrhage during the acute stage of epiploitis.

The omentum becomes retracted. This affects the stomach directly. Traction on the omentum does not produce gastrectasis, strictly speaking, but a gastroptosis results and secondarily a true dilatation of the viscus may ensue. Debet demonstrated experimentally that traction on the omentum was transmitted to the pylorus by means of the greater curvature and that under certain conditions that might produce a fold which diminished its caliber; but in the greater number of cases this is not the principal obstacle to empty-

ing the stomach, because when one draws the omentum down the movable portion of the duodenum comes down along with the stomach, while the second portion remains fixed and between the fixed and movable portions of the duodenum a decided curvature results which decreases the lumen and becomes an obstacle to the free emptying of the stomach.

Stasis of the stomach contents results; vomiting ensues accompanied by all the ordinary symptoms of fermentation and its consequences. A temporary dilatation occurs, which finally becomes permanent.

It would seem then of importance to search for lesions of the appendix or the female genital organs in cases presenting intractable digestive symptoms, for in still another instance can it be shown that interference with gastric motility is an efficient cause of great gastric distress. Surgical remedial measures offer hope in some of these conditions.

FREQUENCY OF LEAD POISONING.

THERE seems to be no doubt now in the minds of those best situated to have definite knowledge in the matter that lead poisoning is much more frequent in this country than is usually thought. Two years ago Prof. Osler announced as the result of the careful collation of the statistics of Johns Hopkins Hospital for a period of twelve years, with those of St. Bartholomew's Hospital, London, for the same time, that gout was comparatively much more frequent in this country than had been imagined. He added that American gout was usually earned and not inherited and that the two underlying pathological conditions on which it developed were changes in the system brought on by too free indulgence in malt liquors and the presence of lead in the tissues. According to the statistics of Johns Hopkins Hospital, for every four patients admitted to St. Bartholomew's Hospital suffering from gout three patients suffering from the same disease are admitted to Johns Hopkins. Possibly at least one-third of our American cases of gout are due to chronic lead poisoning.

It is too often the custom to think that plumbism gives very characteristic symptoms that can scarcely fail of recognition. Lead colic, plumbic constipation, wrist-drop and the blue line on the gum, while usually present, are by no means necessarily in evidence, or their occurrence may be so masked by other circumstances as not to be definitely characteristic. Very few painters entirely escape the effects of lead in the system. This is especially true now that the painting of ceilings and of the walls of high buildings compels painters to work in such positions as to have the lead on their brushes above their heads for a good part of the time while they are at work. Recently Sir William Gowers again reminded the profession that it is almost impossible for a painter to escape the absorption of lead in toxic amount under such circumstances.

The tradition in the painting trade, however, is that only about one in three or four suffer from lead poisoning and these are supposed to be unfortunate individuals in whom an idiosyncrasy causes even small amounts of lead to produce serious effects. Such individuals suffer from the very beginning of their occupation as painters. It is well recognized that there is a marked idiosyncrasy existing in certain people, which makes them liable to suffer from even minute amounts of lead. It has happened repeatedly in country houses that while a whole family has taken the water from a newly constructed reservoir flowing through new lead pipes, only one member of the family has suffered from the small amount of lead that was dissolved in the water owing to the presence of slight amounts of carbonic acid or some of the carbonates in it. No human system, however, will stand contact with lead for a protracted period without suffering severely, and it is the latent cases which prove eventually more disastrous than the frankly acute toxemias that develop early in the association with lead. The lead kidney may develop very insidiously. Serious lesions of the nervous system may give only slight symptoms for a considerable period. A little awkwardness in the use of the forearm and hand may be noticed for many months before some injury, such as a sprain of the wrist, brings on an attack of characteristic wrist-drop showing how saturated with lead the nervous tissues have become.

In his recent series of clinical lectures Sir William Gowers calls attention to the ease with which cases of lead poisoning may be overlooked, unless the physician's attention is especially called to this question. One of the cases which he discusses at some length had evidently come to him from America where the diagnosis of hopeless and progressive muscular atrophy had been made, though his discovery of a lead line on the gums caused him to give a favorable prognosis at once. In this case at first sight the gums seemed normal. But on more careful inspection and espe-

cially on examining the gums of the upper jaw with a lens, several spots were found at which there was a slight separation from the teeth and at these points Sir William found two or three indubitable fragments of the characteristic lead line.

In the course of this lecture Sir William dwells on the characteristics of the lead line on the gums, as he has seen it. He says it is typical in proportion as it approaches Euclid's definition of length without breadth, always provided it is black. Contrary to the usual text-book declarations in the matter, according to which it is said to be blue, Gowers has never seen any color in it. It is never present unless the gums are slightly separated from the teeth. It may exist only at two or three isolated spots or on the tips of the projections of gum between the teeth. It can then only be found by a most careful and thorough search on the upper jaw as well as the lower. He insists that the smallest fragment, if distinct, is as significant as the most extensive deposit.

Gowers emphasizes particularly the number of forms of nervous disturbance that may be due to lead poisoning. The brain itself may suffer and saturnine encephalopathy is not very infrequent and is usually attended by optic neuritis. The common peripheral neuritis of which wrist-drop is the characteristic manifestation is only one of its effects. A slow chronic atrophy of the muscles of the forearm and hand, affecting first the interossei and developing exactly like spinal atrophy, is far more enduring than the wrist-drop and may even become permanent. Optic nerve atrophy alone, without brain symptoms, may be due to lead, and it may cause slight forms of sclerosis of the cord. Tremor may occur and chronic convulsions that simulate epilepsy. He has also found hysteria, especially in predisposed subjects. While headache is a frequent effect, neuralgia of great severity may be the most prominent symptom of the disease. On the other hand, symptoms of general nervous weakness without any definite localization may be due to lead poisoning that gives no other manifestation of the toxic process at work in the system. This affection only too often masquerades as neurasthenia and is but another proof of the abuse of that unfortunate word.

Philadelphia Hospital.—Miss Mary McDonnell has been appointed assistant chief nurse in the Philadelphia Hospital. She comes from the Massachusetts General Hospital and takes the place made vacant by the resignation of Miss Lippincott.

ECHOES AND NEWS.

NEW YORK.

Alumni Association College of Physicians and Surgeons.—The annual meeting of the Association will be held at Sherry's, Wednesday, May 25, 1904, at 8.30 P.M. Members are requested to notify the Secretary, Dr. H. E. Hale, 150 West Fifty-ninth Street, before Tuesday, May 24, if they expect to be present.

Tuberculosis Clinic.—Dr. Thomas Darlington, President of the Board of Health, decided to open a night class at the Tuberculosis Clinic of the Department of Health at 967 Sixth Avenue, the hours being from 8 to 9 P.M. on Monday, Wednesday and Friday. This evening class began last Monday, May 16, 1904. Two doctors and two nurses are in attendance and all medicines are furnished free of charge. Since the opening of the Clinic on March 1, 1904, from 250 to 300 patients a week have been in attendance from 9 A.M. to 4 P.M. This new clinic is for those patients who are unable to attend during the day. Special cards for the reference of patients to the clinic for diagnosis or treatment will be furnished on request. Physicians and others interested are cordially invited to visit the Dispensary.

Commencement at Woman's Medical College.—Five young women were graduated last week at the forty-first annual commencement exercises of the New York Medical College and Hospital for Women. The young women who subscribed to the Hippocratic oath, administered by Professor M. Belle Brown, the dean of the faculty, were May Darrach, Ethelyn Augusta Frances Fuller, G. Holm, Isabella Thompson Smart and Mary Sutton Macy. The prize for the highest average for four years' work was awarded to Miss Macy. Mrs. Jean Williams won the junior prize in medical jurisprudence, Miss Edwina Frick the sophomore prize for the best work in anatomy and Miss Eleanor Van Buskirk the freshman prize for highest standing.

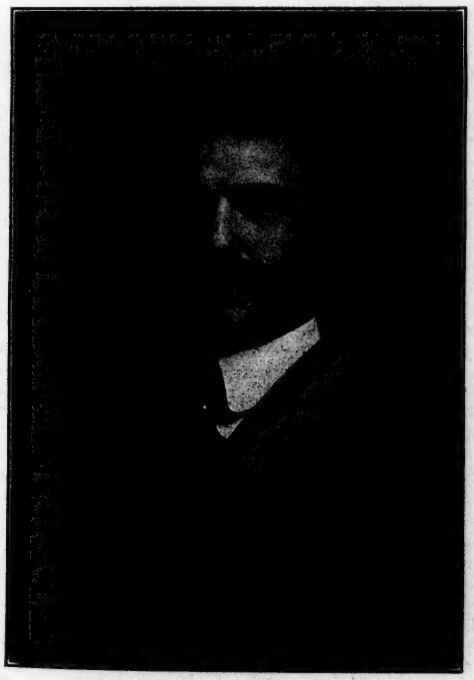
Examination for Superintendent, Rome State Custodial Asylum.—An open competitive examination will be held at Albany, Buffalo, New York and Syracuse, June 3, 1904, for the position of superintendent of the Rome State Custodial Asylum. The authorized maximum salary is $4,000 with maintenance for the superintendent and family. The statute requires that the superintendent "shall be a resident of this State, a well-educated physician and graduate of a legally incorporated medical college," and must "have had a suitable experience and training of not less than three years in the care and treatment of the mentally defective classes, epileptic or insane." Subjects of examination and relative weights: Laws relating to the institution and the commitment, care and treatment of the dependent and defective classes, 1; institutional care, training and treatment of the custodial class of feeble-minded persons and idiots, 3; institutional supervision, administration and discipline, 2; education, experience and personal qualifications, 4. Persons desiring to enter the examination must execute applications on forms supplied by the Commission and file them in its office before noon of June 1. For application blank, address Chief Examiner, State Civil Service Commission, Albany, N. Y.

Director of Pathological Laboratories, Bellevue Hospital.—The Civil Service Commission will hold a competitive examination June 7, 1904, for Director of Pathological Laboratories, Department of Bellevue and Allied Hospitals. Applications will be re-

ceived from residents of the State of New York until May 28, at 61 Elm Street. The salary is $5,000 a year and the successful candidate will be required to devote all his time to the work, abstaining from private practice or connection with a medical college.

Addition to Loomis Sanatorium.—Through the efforts of the Children's Guild of the Loomis' Sanatorium a Children's Cottage has just been opened in connection with the Annex where it is possible to care for twelve children under fifteen years of age. There are in this cottage two supported beds and the other ten patients will be received at the regular Annex rate of $5 per week. As a competent nurse is in charge, even young infants can be admitted. Candidates for admission to this division of the Sanatorium need not be cases of pulmonary tuberculosis necessarily but glandular and bone cases and such surgical cases as have been operated upon and require such climatic advantages and environment as can be accorded them during convalescence, will be received. A separate dietary adapted to the requirements of these young patients will form a feature at the Children's Cottage. Applications for admission may be made direct to the physician-in-chief or to any member of the medical staff of the Sanatorium.

New Head for Bellevue.—At a meeting of the Board of Trustees of Bellevue and Allied Hospitals, held last Friday, a resolution was adopted appointing Dr. William P. Spratling, Superintendent of the Craig Colony for Epileptics, at Sonyea, N. Y., to the Superintendency of Bellevue Hospital, vice Dr. William Mabon, resigned. Dr. Spratling will begin his new duties on June 1. Dr. Spratling's career has been one of exceptional promise. He was born in Chambers County, Alabama, October, 1863, and was graduated in medicine from the College of Physicians and Surgeons of Baltimore in 1886. Following graduation he was Demonstrator in Chemistry and Assistant Resident Physician at the Maryland Maternity Hospital. For five years he was on the staff of the New Jersey State Hospital for the Insane at Morris Plains, and in 1895, after a competitive examination, was appointed Superintendent to the Craig Colony for Epilepsy. Following his appointment Dr. Spratling went for a second time to Europe, continuing his study of institutions for the insane, and on his second visit he lived for some time in the German Colony for Epileptics at Bielefeld. He has been instrumental in converting a wilderness at Craig Colony into a well-laid out village of sixty-six buildings, and an equipment capable of taking care of fully 10,000 people, and has brought into practical realization the hopes and plans of those interested in epilepsy at the Colony, making it a model for all time and for all countries. With such a leader New York City can hope for great things in the future.



DR. WILLIAM P. SPRATLING.

Defense of Insane Hospitals.—Dr. William Hirsch recently sent to the *Times* a long letter explaining away apparent abuses of the insane in State hospitals and exonerating the attendants. He says in part: "From time to time there are reports published in some of the daily papers of alleged 'cruelties' against patients committed to the Manhattan State Hospital. There are constantly about 4,000 patients under treatment in the hospitals of Ward's Island, and if we assume that each patient has an average of five relatives who are concerned in his welfare, these articles are likely to startle about 20,000 people and to give them infinite worry by making them believe that their relative is at the mercy of heartless brutes, and is subjected to the most atrocious cruelties. It is for this reason that I think somebody who is thoroughly familiar with these hospitals should be heard on this subject.

"A great many insane persons suffer from a symptom called delusions of persecution. Patients of this kind complain constantly about their assumptive enemies, who have formed a conspiracy against them and who torture them in all possible ways. As soon as these patients enter the hospital they imagine they are being poisoned and tortured by the officers of the institution. If in addition to their delusions they suffer from hallucinations, they actually see and hear their enemies who maltreat and torture them. Their stories are sometimes so plausible that a layman will invariably believe them, not being able to recognize the fact that a person may talk quite coherently and still be insane.

"It is possible, of course, that in the attempt to restrain, feed, or clean a patient forcibly a nurse may act awkwardly and perhaps inflict an injury which a more skilful nurse would have avoided; but is that a case for the District Attorney? No more than a case of septic infection in a surgical ward. I want to assure people that their friends in the hospital are treated according to the most modern scientific principles; that everything that possibly can be done is being done for them, and that there prevails only one spirit in the Manhattan State Hospital, and that is the spirit of humanity."

PHILADELPHIA.

Methodist Hospital.—A bequest of $20,200 by John N. Doak provides for four free beds in the Methodist hospital.

Pasteur Institute Desired.—The officials of the Bureau of Health are strongly in favor of establishing here an institute for the treatment of rabies. The recent preventive treatment of two persons

through the kindness of the New York Health Department has led to the suggestion that a laboratory be founded in this city. Several deaths from hydrophobia have recently occurred.

Streets to Be Flushed.—To get rid of the great quantities of dust on the streets at the present time the street-cleaning contractors are hereafter to flush the streets daily from the fire plugs. In addition, Market and Chestnut streets are to be sprinkled every two hours, from 8 A.M. to 6 P.M. Chief Sutcliff refuses to entertain the idea that the dust spreads contagion and looks upon the new measures as only conducing to the comfort of the public.

Philadelphia Hospital Examinations.—The examination of candidates for resident physicians of the Philadelphia hospital was held May 10. Ninety-five applicants, among whom were three women, took the examination. The examining board consisted of Drs. John H. Gibbon, W. T. Longcope, and W. E. Hughes. Nineteen positions are to be filled.

New York Certificates to Be Credited.—As the result of a recent conference, it is announced that certificates of preliminary examination in New York will be given full credit by the Pennsylvania State Board of Medical Examiners. Some months ago this privilege was refused which caused great dissatisfaction among many medical students.

CHICAGO.

Donation of $75,000 to the Maurice Porter Hospital.—The Maurice Porter Hospital will be known in the future as the Children's Memorial Hospital. Mrs. Porter has given $75,000 toward a new building in memory of her son. This institution will be the nucleus of a new hospital where adequate provision for the care of the poor children of Chicago will be made.

Money for Augustana Hospital.—At the Illinois Conference, Augustana Lutheran Synod, the Board of Directors of Augustana Hospital, Chicago, was authorized to borrow $100,000, with which to erect an addition to the Hospital. Dr. M. Wahlstrom was elected Superintendent of the Hospital, and Dr. C. G. Folsom, of Galesburg, and Dr. Theodore Freeman, Chicago, were elected members of the Hospital Board.

Rents Old Training School.—The Board of Trustees of the Dearborn Medical College has leased the old Chicago Manual Training School Building, Twelfth Street and Michigan Avenue, together with the Pharmaceutical Department of the University of Illinois. Because of the removal of the school to its new quarters, the series of lectures to the police on first aid to the injured will be abandoned temporarily.

Music for the Insane.—Dr. V. H. Podstata, Superintendent of the Dunning Institutions, in a recent address stated that the salutary effects of music on the disordered mind are many and profound. "The first effect of pleasing, harmonious sounds is a relaxation of special nervous tension. The harmonious sound wave reduces the horrible inhibition and the mental agony of the melancholy patient. It liberates the pent up energy and diverts the association of ideas. In the maniac the constant flight of ideas and motor restlessness is moderated and often checked. In the purely deluded the attention is diverted so that at least temporary stay is achieved in the abnormal mental aberration constantly inclosing the poor mind in a deep network of delusions. The demented patient is stimulated and aroused to activity. In all cases the harmonious impressions cause a relaxation of circulation of blood. The congestion is relieved, also the anemia, and, as a result, not only the brain, but all the organs of the body are enabled to return to the normal activity. The stomach can now secrete sufficient quality and quantity of digestive ferments, and the elimination of poisonous waste products increases. As a further result, reconstruction may take place and the patient be given better chance for improvement. What, then, is the philosophy of the effect of music upon the brain? Surely no one can expect that the structural weakness of the brain, due to impediments in development from hereditary causes, will be corrected by a melodious harmony of sound. Neither can the sweetest music remove from the blood the alcoholic or other poisons causing a steady deterioration of all tissue, particularly the highly organized and sensitive associative nervous network in the brain.

The Evolution of the Modern Operation for Entropium of the Upper Lid.—Dr. F. C. Hotz read a paper on this subject before the Chicago Medical Society. In the normal lid the free margin stands perpendicularly on the eyeball and also forms with the eye lashes approximately a right angle, keeping the latter at the same distance from the globe in all the movements and positions of the lid. In entropium the lid margin inclines towards the eye and carries the cilia down with it so that they touch the globe and cause more or less irritation by friction. For the relief of this irritation the cilia must be turned away from the eye; three different schemes were employed: skin traction, changing the curvature of the cartilage, and the making of a new lid border. Along each of these lines the operations were gradually perfected and out of the combination of them evolved the modern entropium operation. The traction scheme is the oldest, it attempts to turn the inverted lid border straight by traction exerted upon it through the skin. A study of the operations based on this scheme shows the following course of evolution: (1) Traction through ligatures, which produced a hideous deformity of the lids. (2) Traction through shortening the skin, which handicapped the lid in its movements so that it could not be closed. (3) Traction through skin shortening combined with sliding the cilia upward on the tarsus, which had the same mutilating effect, and finally (4) traction by drawing the lid skin up and fastening it by sutures to the upper border of the tarsus. This method secures a constant and uniform tension without mutilating the lid. But traction alone is not effective enough in the higher degrees of entropium, especially if complicated by irregular growth of the cilia. To facilitate in such cases the upturning of the lid border the scheme of grooving the cartilage was introduced. One way was to make a transverse incision through conjunctiva and tarsus above the margin. This proved a complete failure because this transverse groove on the conjunctival side of the tarsus filled up with cicatricial tissue the contraction of which necessarily drew the lid border down again. The other way was rational and successful. It is Streatfield's operation of removing a transverse wedge-shaped piece from the cartilage, the base of the wedge being on the cutaneous side of the lid and the apex near the conjunctival surface. Therefore if the edges of this groove are brought together the lid border with the cilia is turned up. The scheme of turning up the cilia alone and supporting them by a new lid margin was first suggested by Spencer Watson in 1874. He slid the cilia up on the tarsus, like Arlt, but instead of holding them in their

new position by skin traction he supported them by a skin flap transplanted below. This method then passed through a number of modifications and finally developed into the simple but effective operation of splitting the lid border deeply, turning the cilia bearing edge up and filling the groove under the cilia in the margin with a slender Thiersch graft. If to this rebuilding of the margin is added the fixation of the lid skin to the upper border of the tarsus the operation yields perfect results. Thus evolution has led to two excellent methods; the combination of grooving the cartilage with skin traction from the upper border of the tarsus, and the combination of rebuilding the lid margin with skin traction from the upper border of the tarsus.

Radical Mastoid Operation for Chronic Purulent Otorrhea.—In a paper on this subject, Dr. Frank Allport pointed out the reasons for and objections to the radical mastoid operation for the permanent relief of chronic purulent otorrhea. The writer believed that the asking of a single question should place the necessity for the radical mastoid operation for the relief of chronic purulent otorrhea in its proper light. Why should ordinary rules of surgical expediency, which point to the removal of necrotic and dangerous tissue in other portions of the body, be more or less ignored in cases of intractable chronic purulent otorrhea? This question was emphasized by the fact that in almost all such cases the morbid changes were not confined to the middle ear space, but were continued back through the aditus ad antrum to the antrum, and usually into the mastoid cells. The dangers of the radical mastoid operation were such that, while they should not deter a competent and progressive surgeon from undertaking the work after the conviction for its necessity had been reached, the operation should not be performed without much study, experience and observation, and not until its urgency was conscientiously manifested. The chief objection to the radical mastoid operation was the production of facial paralysis (an accident which should seldom, if ever, occur after the operation for acute mastoid abscess), and this was a menace of no mean caliber, and one from which the average operator might well shrink. The facial nerve might be injured in any portion of its course during the operation, from its entrance into the middle ear at the upper, middle portion of the tympanic wall to its exit from the skull at the stylomastoid foramen. Another danger to be avoided during the radical mastoid operation is the infliction of an injury to the horizontal semicircular canal. The wounding of the sigmoid portion of the lateral sinus was undoubtedly one of the dangers of the radical mastoid operation, although the author believed that this danger had been very much overestimated both as to its probability and also as to the damage accomplished by such an accident. Another danger in the radical mastoid operation was the possibility of exposing the dural covering of the temporosphenoidal lobe or the cerebellar lobe of the brain, and this danger had been much overestimated. But little anxiety need be entertained even if such an accident should occur. While meningitis and other intracranial complications and accidents to the facial nerve, horizontal semicircular canal, sigmoid sinus, etc., may result from the performance of the radical mastoid operation, the only occurrence that seemed to the writer to sustain much weight was the embarrassing and unfortunate occurrence of facial paralysis. Another objection to the operation was the fact that the ultimate result was not always successful as to the cessation of the discharge. A fourth objection, which was frequently raised, was the possible bad effect upon hearing. Purulent tympanic infections were responsible for about one-half of the brain abscesses of the world, and that in the United States alone four thousand otitic brain abscesses occurred annually, which proportion was trebled in Germany; that chronic purulent otorrhea was responsible for most of these, and that death occurred in about one in every thousand cases of ear disease of all kinds that came under treatment. Hundreds of cases of chronic purulent otorrhea presented themselves to physicians to be cured. Shall physicians be satisfied with eternally, month after month, and year after year, cleansing, drying, powdering, scraping these middle ears, when they must know that the real seat of the disease could never be even touched except by the radical operation?

GENERAL.

Ruling in Favor of Oxalic Acid.—Attorney-General Cunneen has decided that while grocers may not sell paregoric and witch hazel under the pharmacy law, they may sell oxalic acid. In an opinion addressed to George W. Ryan, president of the Buffalo Retail Grocers' Association, the Attorney-General says: "Oxalic acid is largely used in calico printing, dyeing, and the bleaching of flax and straw. I do not know of any use to which paregoric and witch hazel are put to other than in the field of medicine. I am of the opinion that paregoric and witch hazel may not lawfully be sold by grocers and that oxalic acid, although a dangerous poison, may lawfully be sold by grocers for use in the arts, but not for any other purpose. Oxalic acid, when at all sold, must, of course, bear the poison label as required by Section 198 of the statute.

We may henceforth reasonably expect a decline in the use of carbolic acid as a self-destroyer in favor of its powerful ally so easily procurable under the above conditions.

Physical Training and Heredity.—A very interesting if not entirely satisfactory set of conclusions have been arrived at through the excogitations of M. Tissié, physical director in the Bordeaux Academy in Paris. M. Tissié believes that the maintenance of a fair degree of health depends upon the proper distribution of bodily energy between body and brain, and that overwork of either results in mental or physical fatigue. In his estimation no training that suppresses appetite, increases thirst, or disturbs sleep can be beneficial in the slightest degree. Excessive exercise means a foundation for a "double personality" and leads to "hysteria." On the psychological side general bodily movements of extension mean pleasure; while those of flexion tend toward grief. Furthermore it is possible to transmit the good or bad results of physical training to offspring and then to directly influence the well-being of a future race. On this point very special stress is laid. An attempt is made to classify various organs in the body according to their importance; viz., (1) brain, (2) lungs, (3) heart, (4) stomach, (5) splanchnic organs and glands, (6) muscles.

It is unfortunate that the gentleman in question has left so little proof either direct or indirect in support of his assertions, and it is always dangerous to theorize when there is a possibility that some one with a little more scientific acumen may obtain facts which shall disprove one's most carefully treasured bubbles. There seems to have been plausibility enough in the present instance, however, to merit the attention of reputable scientific journals, chief of which is the *Revue Scientifique.* In criticising M. Tissié's statements, this journal concurs in the idea that there is probably a potential general nerve force which can become physical or psychical according to the demands of the individual at any particular moment. Whether this force shall be

liberated as muscular energy, for example, or as its psychical equivalent, depends upon the constitution of the individual and upon his requirements. For instance, if the "valve of cerebration" is hard to open we have the hard-handed laborer or the athlete; if this so-called valve be easy to open we have the esthete.

This view is not likely to become popular in America, especially among our college athletes who object most decidedly to disparaging remarks concerning their mental capacity and who are quite anxious to prove the existence of an opposite state of affairs. Their view is reasonable enough, too, when one considers how excessively fatiguing a hard game of football is, and how very few heroes of the gridiron develop anything like the double personality or hysteria described by M. Tissié. As for the transmission of physical characteristics through heredity the fact seems pretty well established already and there is little more to be done about it save the collocation of well-marked and distinctively interesting cases as they may arise.

As illustrating the danger from mental overwork and consequent nervous breakdown, the *Revue* thinks that "the nervous are poisoned under the influence of overwork resulting in cerebral lameness," analogous to physical lameness from a like condition in the muscles. This may be a likely explanation, it certainly has the quality of being novel; but so far as the reporter's own experience goes most cerebral lameness seems to be of the congenital type and quite incurable by any manner of elaborate "exercise," fatiguing or otherwise.

The *Revue* thinks that the medical profession should take a more vital interest in these matters because its "ideas on these subjects are essentially rudimentary, since there are no courses of physical training in medical schools." It seems likely that if all the subjects one ought really to know come to be taught in medical schools, human life will have to be lengthened considerably beyond the Biblical three score and ten mark. One ought to be glad that he was graduated before he became fully aware of his reprehensible unfitness.

OBITUARY.

Dr. CLINTON CUSHING, one of the oldest and best-known physicians of Washington, D. C., died suddenly at his home on May 10. Dr. Cushing retired from practice some years ago.

Dr. WILLIAM WATERWORTH, for twenty-two years a resident of Brooklyn, N. Y., where he was a practising physician, died May 11. He was born in Salem, Ohio, in 1851, was graduated from Adelbert College, and in 1878 from the Bellevue Medical College. He was a member of the Union League Club of Brooklyn, of the Royal Arcanum, and of several medical societies.

Dr. WILLIAM H. MCGEE, a leading physician of Warren County, N. J., died May 11, aged fifty-six years. He was a member of the Warren County Medical Society and resident physician of the Pennsylvania Railroad Company.

CORRESPONDENCE.

CARCINOMA OF THE STOMACH.

To the Editor of the MEDICAL NEWS.

DEAR SIR: I desire to draw attention to a clinical sign which has proven the means of putting me on the right track in cases which further examinations have proven to be gastric carcinomata. I refer to the stomach transparency which can readily be seen with the fluoroscope in many of these cases without previous distention of that organ with gas. In a healthy stomach the walls contract on the contents, but in cases of carcinoma they very early seem to lose this physiological power of responding to the presence of food and the fundal area remains continuously dilated and distended, even though there be no displacement downward of the lower gastric border and even though a glass or two of water be given to these patients to drink. The same fact can be to some extent brought out by percussion, but not so well, as the pulmonary emphysema, nearly always present in these cases, makes it difficult.

C. M. COOPER, M.B., M.R.C.S.

San Francisco, Cal., April 26.

POISONING BY EGG.

To the Editor of the MEDICAL NEWS:

DEAR SIR: Apropos of Dr. Clemens' interesting instance of Poisoning from the White of Egg published in the MEDICAL NEWS of April 16, 1904, I beg to report a somewhat similar idiosyncrasy in a child, now three and a half years old, who has been under my care since birth; with the difference, however, that in my patient it appeared to be the yolk, and not the white, of egg which caused the untoward symptoms. The idiosyncrasy was first noticed when, at the age of twelve months, the raw yolk of egg was added to the infant's bottle of milk; this was followed in about two hours with great pallor and severe vomiting and prostration, twenty-four hours elapsing before the child had regained its usual health. A few weeks later a similar train of symptoms followed the admixture of a whole raw egg with the food. The raw white of egg alone was then added to the bottle, but was not followed by any disturbance. This peculiarity continued throughout the whole of the second and third year, the administration of whole egg or egg yolk, whether raw or cooked, always producing the symptoms described above. Lately, since the child has attained its third year, it is being educated to eat egg yolk, by giving it minute quantities of food containing the yolk, such as custards and farinaceous puddings, and so far no disturbance has followed.

The symptoms in my patient cannot be explained by gastric irritation alone, induced, for instance, by the large quantity of fat present in the yolk of egg; the symptoms were on each occasion of distinctly toxic character, the prostration being marked and prolonged, while some of the attacks were attended with fever. Nor could they have been due to decomposition changes; they followed whether State, city eggs or fresh country ones were eaten.

Idiosyncrasy as regards eggs is not uncommon. People constantly assert that eggs make them bilious. Sometimes this is imaginary, but in many cases the inability actually exists. Jonathan Hutchinson in his work, "The Pedigree of Disease (London, 1884), relates several cases of this nature, in some of which the symptoms were so violent as to excite suspicion that poison had been given. In the *British Medical Journal* for March 11, 1899, there is the report of a case in which the very smallest quantity of egg caused the most violent symptoms, resembling those of an irritant poison; in this patient a small portion of white of egg placed on the skin was followed by an abundant urticarial eruption. Robert Hutchinson (Food and Diebetics, London, 1901), in speaking of idiosyncrasy in respect to eggs, says that the digestive juices of some persons apparently act in such a way as to produce poison when eggs are introduced into the stomach. In many cases it has seemed to the writer that the trouble lay in the yolk, possibly because of its large fat content. On the other hand, especially in the cooked egg, the white is undoubtedly the offending element; indeed, this would seem to be the case in the majority of instances—more, however, when

given in combination with the yolk than when eaten alone. Robert Hutchinson points out that the sulphur of the egg is contained almost entirely in the white, and that when eggs rot, and, in some cases during digestion, alkaline sulphides are developed, and these being acted upon by phosphoric acid produced from the yolk, sulphureted hydrogen is liberated, to which the symptoms may in some cases be due. However this may be, it is significant that eggs and fish, the two dietary articles with which individual susceptibility is most frequently associated, are the very ones most susceptible to changes from overkeeping.

Some of the instances of egg-poisoning are undoubtedly due to the changes in the eggs themselves; but others can only be explained by the term idiosyncrasy—a word, which according to J. Hutchinson, is intended to denote one ignorance of causes, though in no degree to express disbelief in their existence. I am, sir,

Very respectfully yours,

Philadelphia, April 27. D. J. MILTON MILLER, M.D.

SOCIETY PROCEEDINGS.

ASSOCIATION OF AMERICAN PHYSICIANS.

Nineteenth Annual Meeting, held at Washington, D. C., May 10 and 11, 1904.

(Continued from Page 955.)

SECOND DAY—MAY 11TH (*continued*).

Eosinophiles and Bacterial Infection.—Dr. F. L. Opie, of Johns Hopkins, Baltimore, described some recent observations on eosinsphile cells, made with the purpose of determining the relation of these cells to bacterial infection and bodily resistance to bacterial invasion. Various observations in this line have been made but they are not all in accord. Observers saw the granulations streaming toward the part of the eosinophile cell that happened to be in contact with a bacterium and then disappear as if in their dissolution some protective purpose was involved; other observers did not confirm these observations, however. Ehrlich found in his investigations of cells that shortly after infection the polynuclear leucocytes were increased and that, apparently at least, the eosinophiles were reduced in number. This observation has been amply confirmed and it is now generally conceded that in fevers the eosinophiles are decreased in number.

Bacterial versus Animal Parasitic Infections.—While in bacterial infections this reduction of the eosinophiles always occurs with animal parasites, as the *Trichina* and most of the intestinal parasites there is an increase of eosinophiles. This is true also in diseases such as smallpox and scarlet fever, in which the presence of an animal parasite as the causative factor is suspected and in malaria, where this type of parasite is known to be the cause. This difference in all reaction promises to be of diagnostic significance for obscure forms of disease due to animal parasites.

Study of Eosinophiles.—Guinea-pigs have normally 5 to 6 per cent. of eosinophiles, so that the study of these formed elements in them is comparatively easy. Chronic infections, as tuberculosis were found to bring a decrease in the number of eosinophiles. This was true also for such infections as would ordinarily cause the death of the animals in about a week. No eosinophiles were to be seen in the circulation when the fatal termination was approaching in these diseases. They had disappeared also from the tissues. In acute infections the disappearance was much more rapid. In severe infections a few hours sufficed to bring about the disappearance of these cells. The *Bacillus pyocyaneus* caused their disappearance in about twenty-four hours. As a rule, guinea-pigs recover from this type of infection and the diminution of eosinophiles is found to correspond with an increase in the polynuclear cells. On the second and third day the eosinophiles reappeared then gradually increased beyond their original number.

Fate of the Eosinophiles.—The eosinophile cells have disappeared from the peripheral circulation but they can be found accumulated near the point of infection. When the infection is in the peritoneal cavity where the pathological picture can be studied so well, the eosinophiles are found in immense numbers in the veins of the omentum and mesentery and also escaping from these into the surrounding tissues. This process of adhesion to the walls of the veins and migration can be seen within an hour after an acute infection. The eosinophiles do not seem to act as phagocytes, though certain other cells, *e.g.*, the large mononuclear cells which accompany the eosinophiles do. These latter are the macrophages of Metschnikoff.

Life History of Eosinophiles.—The life history of some of the large eosinophiles is extremely interesting. They seem to originate in the bone-marrow, and are carried thence in the circulation to the spleen where for a time they are harbored in the reticular spaces. Here they seem to find favorable circumstances for their multiplication and the occurrence of this process might easily give rise to the thought that they originated here. It is from here that they eventually find their way into the system for the exercise of their normal physiological functions.

Conclusions as to Eosinophile Life.—Dr. Opie considers that it must be concluded that eosinophiles respond to chemotaxis and find their way immediately to the neighborhood of an infected focus. Here they but rarely act as phagocytes, but they play some other rôle in the mechanism of protection, or at least attempted reaction against bacterial invasion.

In reply to a question, Dr. Opie, in closing the discussion, said that at first bacteria cause a decrease but subsequently an increase of eosinophiles while animal parasites cause an increase from the very beginning of their habitation within the organism. This phenomenon is strikingly diverse, yet there is in the end a similarity that points probably to more or less identity of action and reaction.

Chloroma with Leucemia.—Dr. George Dock, of Ann Arbor, Mich., reported a new case of the rare disease chloroma, that is, the occurrence of greenish tumors at the same time with a leucemic condition of the blood and presented a study of all the cases of the disease that have been reported since 1893. Formerly this affection was considered to be some sort of pernicious anemia. Later it was thought to be a form of leucemia complicated by a tendency to the formation of malignant tumors. The tumors were generally considered to be sarcomatous. Usually a decided weakness is one of the first symptoms of the disease and this is followed by the development of exophthalmos and the occurrence of tumors in the temporal regions with symptoms of their presence within the skull and also along certain of the bones. Dr. Dock's case began at the age of forty-five years, without any known cause, and weakness was such a prominent feature very early in the affection that the patient stayed in bed almost from the very beginning.

Symptoms.—None of the external lymph glands were enlarged, though there was a very marked leucemia. While preparations were being made for more detailed study of the blood itself and of the secretions, especially the urine, the patient unexpectedly succumbed to the disease. At the autopsy a number of

green tumors were found lying along the front of the vertebræ, just behind the sternum at the origins of the muscles and in most of the internal organs, especially the liver, kidneys and lungs. This very general invasion shows that the disease must have been at work some time before the first symptoms declared themselves, or at least before the patient would submit to thinking himself ill. The consequence was the unexpected death.

Blood Peculiarities.—The blood contained very few large nucleated red cells and in general, the red cells were affected only as in severe secondary anemia. Eighty per cent. of the white cells, however, were different from any ordinary blood cells and resembled bone marrow cells. A much greater proportion than normal of the white cells were eosinophiles. Some basophiles were seen but only just before death occurred. Unfortunately no autopsy of the head was allowed, so that it was not sure whether any tumors were present there, though there were no clinical symptoms pointing to this. The long bones also could not be examined and it is in these particularly that many interesting features of chloroma are discovered.

Comparative Frequency of Chloroma.—So far in the literature there are over a score of cases of chloroma, but observations on this type of disease have multiplied rapidly since special attention was called to it in very recent years. Within the last year at least six cases of chloroma have been seen. It seems not unlikely that in the next few years it will be found that chloroma is by no means a rare disease and at the present moment it would seem that clinicians generally should look for it. In all the cases in which complete autopsies have so far been made, greenish tumors have been found at the base of the skull. These are particularly likely to be present in the temporal fossæ. Occasionally the disease is recognized during life, because of tumors growing in the orbit and causing exophthalmos, these tumors also growing into the eyelids and showing distinctly green beneath the conjunctiva.

Tumor Coloration.—Dr. Byron Bramwell said that he reported a case in which the tumors when first seen were of a distinct, somewhat dark slate color. The shade being what would be called cyanotic. Later a distinct greenness developed not unlike that which is seen when, as a bruise is getting well the original black and blue change to green. Many shades of green, however, are seen, from a light sage green, such as occurred in Dr. Dock's last patient to a darker, yet bright green. Often these tumors are found before the condition of the blood is recognized. In one case the removal of the jaw for what was thought to be a sarcoma showed the presence of a greenish tumor, which had also invaded the skull and had many of the symptoms of malignancy. No chemical or biological explanation of the color has so far been found. Recklinghausen's suggestion that it is of parenchymatous origin somewhat as green pus (not that due to any of the actively coloring bacilli) is generally considered to be the only available explanation as yet. Certain of the clots found in the heart in leucemia have a greenish tinge but the heart clots are usually less green than are these tumors.

Blood Picture.—The blood picture must remain the most characteristic feature of the disease. It is that of a lymphatic leucemia but with some specific differences. Usually there is an enormous number of eosinophiles. There is nearly always an increase in the number of neutrophiles. Large lymphocytes are found in large numbers but some lymphocytes are also seen. In general it may be considered a more malignant type of leucemia. When there is an increase in the number of eosinophiles in leucemia, then the patient must be carefully looked over for the presence of any tumor formations and any hint of a greenish appearance.

Dr. Osler said, in discussing Dr. Dock's paper, that it may be well to try and get at the clinical picture of the disease, in order that clinicians may be ready to have suspicions aroused with regard to it, for it is evident that the affection is much more frequent than the number of cases so far reported might lead us to think. The leucemic condition would naturally last for a considerable period. When it is accompanied by great weakness, this should always be a suspicious sign.

Similarity to Scorbutic Leucemia.—Dr. Dock, in closing the discussion, said that not all the cases of chloroma reported have run so severe a course as his own. As a rule, indeed, they have had a very close similarity to leucemia, due to digestive disturbances, the so-called scorbutic leucemia, and it would seem impossible that in some cases at least that the absorption from the digestive tract may be the principal factor in the etiology. In answer to a question with regard to the long bones he said that in many cases they are affected, but the only way to determine this is by actual examination. In all blood diseases it would be advisable to examine the long bones, but unfortunately this is impossible, owing to social prejudice. In one case of chloroma where all the bones were examined, some greenish tumors were found in one femur, but not in the other. In answer to another question, Dr. Dock said that it seems not unlikely that a certain number of cases of chloroma have been reported as myeloma, that is tumors of the blood-making bone-marrow. Chloroma evidently gives the definite hint that there are several varieties of leucemia, which will have to be separated clinically, as well as by laboratory investigation, before this disease can be properly understood.

Types of Splenic Anemia or Splenomegaly.—Dr. Alfred Stengel, of Philadelphia, reported cases of enlargement of the spleen with some disturbance of the blood picture. The first case was that of a child three years of age with a rickety look but with very enlarged abdomen due to the presence of the large spleen. The patient succumbed to a complication and at the autopsy some miliary tubercles were found besides the very large spleen. In the second case an Italian suffering from a large spleen, which was thought to be malarial at first (he denied syphilitic infection) and there seemed to be no question of tuberculosis. He had a history, however, that pointed to the existence of the enlarged spleen for a long time and he was very much stunted in growth, with peculiar knobbing of the fingers and in general some serious disturbance of nutrition. In the third case a negress suffering from considerable discomfort because of the presence of enlarged spleen and splenic anemic as a complication had a history in which there was no malaria, though she came from a malarial district in the South and denied syphilitic infection. Her last two children, however, had been stillborn. Her condition became so severe that splenectomy was advised and there was at first some disturbance of the blood and later an absolute return to normal, which has been retained. The removed spleen showed a series of umbilicated more or less cicatricial pits but was very solid and was evidently invaded by some neoplastic formations. Under the microscope the picture presented was that of a large proliferation of the endothelial elements of the blood vessels of the spleen, giving the very characteristic appearance of primitive endothelioma of the

spleen. No tubercle bacilli could be found, no bacteria could be discovered by Gram's method. There were no signs of sporozoa and no necrosis of tissue in any part. The question whether it might not be syphilis must remain, though Dr. Stengel is of the opinion that it was not syphilitic. At the time of the operation it was noted that the liver was also wrinkled and had something of the dimpled appearance presented by the skin.

Lack of Vital Resistance.—This case exhibited a peculiar and very striking lack of vital resistance to infectious disease. She has suffered from parotitis several times, from pneumonia twice, from bronchitis and from other infections. There is always a low leucocytosis. This may indicate that disturbances of splenic activity are important factors in the production of the resistance to bacterial invasion, which is considerably more important than the virulence of bacteria themselves in the production of disease.

Complexity of Splenic Anemia.—Dr. Osler said that it must be clear to every clinician now that there is an extreme complexity of the subject of splenic anemia and that under the term are included a number of varying conditions. Some of these have a marked similarity to one another, but with distinctive features. Some of them are widely separated. The cases associated with nutritional changes, such as infantilism and clubbing of the fingers constitute one extreme. Dr. Osler has had under observation in recent years nine cases of large spleen. In one of these there was no other manifestation present except the physical discomfort of carrying around the enlarged organ. In four cases there was chronic splenic anemia with a reduction of the number of leucocytes, what would be called a moderate leucemia. Two cases were associated with liver symptoms and these need careful study and recognition as early as possible in order to use whatever prophylaxis is possible. These cases probably bear some relation to Hanot's cirrhosis of the liver and deserve special investigation. There are evidently family forms of splenic enlargement, such as the type studied by Brill, in New York, in which an enlarged spleen could be traced in four generations. Dr. Osler is of the opinion that surgery can accomplish more for enlarged spleens than has been thought. When it is a source of discomfort the enlarged organ should be removed before it has contracted adhesions, or has seriously disturbed the patient's blood equilibrium.

Surgical Intervention.—Dr. George Dock said that it seems advisable to refer cases of enlarged spleen more frequently to the surgeon than is at present the custom. Whenever the hemic processes are negative then operation is indicated. Besides the relief of the patient's discomfort there is a decided advantage as regards our knowledge of the disease. If the spleen is allowed to remain, patients may live for years and other changes take place in the organ so that the autopsy gives a complicated picture and not the true idea of the condition in the spleen as it originally existed.

Movable Spleens.—Dr. B. W. Sippy, of Chicago, said that movable spleen, in women particularly, has in his experience been associated with gradual anemia. In one of these cases seen recently this anemia had reached the extent of two and a half million red blood corpuscles and forty per cent. of hemoglobin. There was a moderate poikilocytosis but there were no nucleated reds present. The spleen was removed and while there was a slight unfavorable reaction afterward, the anemia had decreased since and the patient has continued to be well. The enlarged organ showed only ordinary splenic hyperplasia with some endothelial overgrowth but not enough to stamp the process as true neoplasm and there was no involvement of the liver or lymph glands. The woman had not been a hearty eater for some time and it was possible of course that her lowered nutrition for this reason might have been the cause of her anemia. With regard to Dr. Sippy's presumption of the possibility of lack of nourishment causing anemia, Dr. Cabot, of Boston, said that there is no evidence at all of malnutrition ever causing anything like a true anemia. Lack of food affects other organs but not the blood-making organs apparently. The general statement then that undernutrition may play a rôle in these cases is always an undesirable one.

Philippine Anemia.—Dr. Osler said that among the cases of anemia that will be seen in soldiers who have recently returned from the Philippines there will probably be some cases in which the causative factor will prove to be the Donovan-Leischmann bodies. Many of these cases may be grouped under the heading of malarial anemia when this is really not the case. It is not difficult now to find faithful descriptions of the appearance of the Donovan-Leischmann bodies and there are even a number of specimens of them in the hands of the Marine Hospital Service. Physicians should not lose the opportunity then of getting at the true cause of these types of anemia and perhaps adding to our knowledge of the life cycle of this peculiar parasite.

Dr. Stengel, in closing the discussion, said that splenic enlargement is by no means necessarily associated with a serious pathological condition. It is perfectly compatible with ordinary good health. Cases that come present very different features and at one clinical lesson, not long since, he presented three cases with regard to which the conclusions as to treatment and prognosis were very different.

Cultivation of Trypanosomes.—That Frederick G. Novy, of Ann Arbor, Mich., said that most of the modern progress in bacteriology is due to the cultural methods for the growth of bacteria introduced by Koch. With regard to the more recent pathological organisms which have been brought to attention it seemed very desirable to find a culture medium or a series of culture media. In this country there is a trypanosome which affects rats quite commonly, which, after a series of observations, Dr. Novy has been able to make grow on a combination of agar and fibrinated blood. This does not grow directly on the medium itself but in the water of condensation or in the fluid material which is squeezed out of the agar blood serum mixture during the process of drying. He has now had some organisms which have in this way passed through thirty generations and after transplantation every month have remained alive for two years. These trypanosomes grow very well at ordinary temperatures. They grow faster in an incubator, but die out more rapidly at the higher temperature and have to be transplanted every week.

Living Culture Material.—While waiting to obtain fresh trypanosomes, Dr. Novy has employed inoculation into certain of the small animals as a method of keeping specimens sent him alive. The South African trypanosome may be grown upon the mouse.

The Lewis organism of this type may be grown on ordinary culture media and luxuriates almost as does the *Pneumococcus*. It has been kept alive for eighteen days in a test tube. Once Dr. Novy thought that he had succeeded in making the Bruce trypanosome to grow in this same way, but it proved eventually to be an ordinary rat trypanosome which had grown. These observations serve to show that these microorganisms are not, as has been thought, all of the same type but are very distinct.

Attenuated Protozoa.—Dr. Novy has found that these protozoa when grown at the room temperature may be quite virulent, even after passing through many generations in a test tube. If the test tubes, however, are kept at the temperature of 34° C. for two days while the microorganisms are quite active and reproduce very luxuriantly, being apparently perfectly healthy, yet they will produce no pathological effect. This is the first time that an attenuated form of protozoon has been found. With this modified organism an attempt was made to secure the protective vaccination of rats, but the animals proved too susceptible. Better success has been secured in this line with guinea-pigs and one of these animals has twice survived doses of trypanosome culture which killed the control animals in each case.

Different Forms of Trypanosomes.—The most important feature of present-day development of knowledge of trypanosomes is the conviction of the existence of a number of different forms. At first they were all thought to be the same. Laveran and Mesnil, however, showed quite distinctly that they were different organisms. This complicates the problem of disease but explains many anomalies that would otherwise be hard to understand and opens up a wide field for observation.

Survival of Philippine Trypanosomes.—Recently a medical man from Dr. Novy's laboratory went to the Philippines and under Dr. Novy's directions tried to send him specimen of the trypanosome which causes the surra disease. Ordinarily the blood of animals affected by surra loses its virulence, that is, all its power to reproduce the disease in about five days. Some of the blood is introduced into properly prepared test tubes, however, and after several trials a few of the tubes were found swarming with trypanosomes on their arrival. It took thirty-eight days for the journey, so that the problem of a culture method for this form of organism seems certain to be found. In these tubes one peculiarity was the existence of certain minute forms of protozoa which were at first considered to be so small as probably to lack virulence entirely.

Organisms That Passed Filters.—When an attempt was made to filter the smaller forms of organisms out of cultures the result seemed to be successful as far as the microscope was concerned, but when the filtrate was used for inoculation purposes, animals developed the disease. It seems clear then that very minute forms of the trypanosome, such as passed through Berkefeld filter, may still be capable of producing disease. Variations in morphology form one of the most interesting features of this new class of organisms. In the cycles of existence there seems to be a process of conjugation and then the organism may under certain circumstances divide into a large number of small trypanosomes. Some of these are really flagellate in character and this would seem to place them among the flagellate forms. This morphological peculiarity can perhaps best be understood by the realization of the fact that the spirillum of Obermeier, the well-known cause of intermittent fever, might very well be allied among these organisms under this form. It seems not unlikely therefore that these studies in the morphology of the peculiar protozoa, which the invasion of the tropics by the white man in recent years have brought more especially to attention, may well prove a source of suggestive information with regard to other causes of disease which are apparently better known, yet with regard to which our present knowledge is meager enough.

Zonal Necrosis of the Liver.—Dr. E. L. Opie, of Baltimore, read a paper on the peculiar distribution of various types of necrosis in the liver. The lesion is apt to be confined to certain zones leaving other parts untouched in such a way as to produce quite a striking pathological picture. There are three distinct zones of necrosis that he has had under observation, the peripheral on the outermost confines of the lobule, the central immediately around the central vessel and the intermediate, between these two areas. The intermediate is apt to be in connection with central necrosis more frequently than with peripheral and it is not unusual to find the whole lobule necrosed except for a thin peripheral boundary area where no trace of necrosis is present. These forms of necrosis mark out different parts in the lobule for special functions and it is the accomplishment of this function when toxic substances are present or bacterial invasion occurs that is the active cause of the necrosis.

Acute Yellow Atrophy.—Dr. Opie's studies seem to have shown him that necrosis in the intermediate zone of the liver lobule bears a special relation to acute yellow atrophy. In twelve instances of central necrosis, the lesion seemed to be associated with disturbances of the circulation complicated by infection. Median zone necrosis was associated with pregnancy and this lesion has been described by others as occurring in eclampsia. Out of five hundred autopsies this intermediate zone of the liver lobule was affected nine times. The source seemed to be ulcerative lesions somewhere in the digestive tract and severe digestive disturbances usually accompanied by infectious processes in the gastro-intestinal mucous membrane. In some cases of central and intermediate zone necrosis, where the outer narrow peripheral margin of the lobule was spared, the beginning of the lesion seems to have been in the intermediate zone. In the one case observed in which necrosis of the intermediate zone of the liver was not associated with eclampsia the patient had suffered from the pernicious vomiting of pregnancy. The beginning changes found in this case as well as in the others mentioned bore a resemblance to those which have been described at the beginning of acute yellow atrophy or icterus gravis, as it is sometimes called. It has been known for some time that while these cases are characterized by jaundice and delirium the liver is not always found atrophied. Liebermeister said that on the contrary if the patient dies before the ninth day of the disease enlargement is always found. If the affection continues after this and proves fatal the characteristic atrophy described by Rokitansky will be found. The essential feature is a necrosis with fatty degeneration.

Liver Infections.—In a certain number of cases the typhoid bacillus has been found in livers suffering from acute necrotic conditions. In others the streptococcus has been found. As might readily be expected, in these cases a fatal issue has occurred before the stage of acute yellow atrophy had time to occur. It would seem, however, that this condition is always due to infectious material absorbed from the digestive tract, usually from ulcerative lesions of the digestive tract, producing serious effects in the intermediate and central zones of the liver lobule. Marchand has suggested that regenerative changes in the liver take place either from the center or the periphery; where the infection that causes the tendency to necrosis is not very severe, such regeneration may save the patient.

Malignant Adenoma of the Liver.—Dr. George L. Peabody, of New York, presented the specimens from a case of malignant adenoma of the liver. The patient was a Greek, thirty-eight years of age, who denied syphilis and alcoholism. Two weeks before his admission to the Presbyterian Hospital he began to suffer

acutely from ascites. The symptoms were a sense of weight and a difficulty of respiration. Shortly after his admission to the hospital he was tapped and 7½ liters of fluid were removed from his abdominal cavity. This fluid was a bloody serum so hemorrhagic in character as to look like slightly diluted blood, rather than blood-colored serum. A smear looked like blood. The patient was relieved very much but his ascites recurred again after a few days and he had to be tapped once more. Before the tapping the liver and spleen could not be made out by palpation because of the tension of the abdominal walls due to the fluid. On percussion both the organs seemed to be smaller than normal. After the removal of the fluid neither the spleen nor the liver could be felt, but there was no doubt that both were very much decreased in size. After several tappings the man gradually succumbed with some of the symptoms of cachexia and it was concluded that he was suffering from malignant disease.

Autopsy Findings.—At the autopsy an irregular mass was found projecting on the upper surface of the small hard liver. The lymph glands in the upper part of the peritoneal cavity, in the mesentery and also some of the bronchial glands were found enlarged. There was thrombosis of the large veins of the liver itself and of the spleen. The liver was very much reduced in size and was covered by a number of cicatricial-like puckerings that inevitably suggested syphilis. The liver was irregular from contraction, but also because of the presence of a new growth irregularly infiltrating its tissues. This was of the so-called tubular or trabecular variety, such as is sometimes called adenoma. It consisted of modified liver cells, the larger ones containing two or more nuclei. There were no metastatic growths to be found anywhere, though some of the vessels of the liver were filled with tumor masses.

Usual Occurrence in and Course.—Liver adenoma usually occurs in connection with cirrhosis and is not often seen except in men. In them it is commonest about the age of forty years, rarely in patients beyond that age. It seldom takes more than a few months to bring about a fatal termination. One of the most prominent symptoms is ascites, which reaches a large amount. This fluid is nearly always discolored with blood because there is usually a leakage from some of the vessels of the tumor. In this case it is not difficult to see on the specimen whence the blood came which caused the hemorrhagic serum to have such a bloody tinge. Jaundice is another very common symptom in these cases, though not always present. When a large ascites develops rapidly and the tapping shows the presence of considerable blood, suspicion must always be aroused as to the malignant character of the affection. The clinical picture, however, is in general not unlike that presented by secondary carcinoma.

The Adrenal in Addison's Disease.—Dr. Charles F. Withington, of Boston, discussed the reported cases of Addison's disease and their relation to adrenal tuberculosis. While tuberculosis of these glands is the most common cause of Addison's disease, it is by no means the only one and a number of cases have been noted without any adrenal tuberculosis. In the non-tuberculous cases the lesions found were atrophy of the adrenal glands, interstitial inflammation, cancer, occlusion of the veins of, or hemorrhage into the adrenal structure. In a certain number of cases no disease of the adrenals was found at all. In some of these a lesion of the semilunar ganglion was found. In some others this lesion was not present. In a certain number of cases a pigmentation resembling that of Addison's disease was observed but without any proper warrant for considering the disease Addison's disease.

Atrophy of Adrenals.—In one case reported there was a curious pigmentation that occurred on the backs of the hands and in the axillæ and very markedly in the pits of smallpox on the face. The pigment was dark bronze in color. No pathological lesion of the adrenals was found but there was very distinct atrophy of both these glands. In a certain number of cases of Addison's disease reported the adrenal glands have been found to be very small or one of them has been missing and the other not especially large, but in these cases the possibility must always be remembered of there being adrenal tissue elsewhere to make up for the apparently absent adrenals. Adrenal elements in the kidneys or in other organs or in structures in the neighborhood of the adrenals is not at all unusual and these strayed elements sometimes become the basis for very serious and fatal malignant tumors.

Function of Adrenal.—It is now generally conceded that the symptoms of Addison's disease are due to loss of function on the part of the adrenal glands. The substance which enters the blood from the adrenals and which is necessary for the preservation of the tone of muscles and especially of the muscular coats of the blood vessels is considered to be a secretion rather than an excretion. Something is added to the blood not something taken from it during its course through the adrenal glands. There is no doubt now that adrenal secretions have an influence over even voluntary muscles and this accounts for the marked weakness which is so often seen early in the disease before the affection would seem to have spread far enough to justify the languor which comes over the patient.

Experimental Arthritis and Endocarditis.—Dr. Morris Lewis, of Philadelphia, read a paper describing some recent experimental observations in the production of arthritis complicated by endocarditis in animals by the injection of a culture of a special form of streptococcus. This streptococcus had been found in a case of severe chorea which developed after an attack of acute rheumatic arthritis in a girl. The girl had complained first of pain and a swelling of the ankles and the disease being recognized as acute rheumatism, she was put to bed where she rapidly improved under the salicylate treatment. After a time, however, she became languid and was treated with quinine without success. Then she began to develop choreic movements which finally became so severe that she could not swallow except with difficulty and the sides of the bed had to be padded. When brought to the Infirmary for Nervous Diseases in Philadelphia she was very limp from her journey but still had some choreic movements. When she recovered from her fatigue her choreic movements became more marked and after several days endocarditis developed. This ran a rapid course. Cultures were taken from the median basilic vein as it proved only twelve hours before her death. In this blood, taken with all due aseptic precautions, a streptococcus was found. Cultures of this microorganism, when introduced intravenously into animals always give rise to arthritis which developed after an incubation period of from four to nine days. The animals would not move for some time before swelling could be noticed and it was evident that they were suffering somewhat in their joints, even before marked signs of arthritis developed.

Complicating Endocarditis.—In several of the animals an affection of the heart occurred which was of vegetative character. In nearly all the cases there was a spread of the arthritis from one joint to another after the first symptoms of the affection had developed. The streptococcus found in the blood culture could be isolated from all the affected joints of the animals. In

one of the rabbits it was also found in the vegetations on the heart valves. This streptococcus could not be distinguished morphologically or by any of the ordinary culture methods from the streptococcus which is commonly studied in the bacteriological laboratories. It seems to Dr. Lewis that the organism thus found is the same as has been described by certain observers in Germany and by certain English authorities in the bacteriology of rheumatism. It would seem to fulfil all the requisites demanded of a specific microorganism. It is found in the blood of a person suffering from the disease; it can be isolated in pure culture; it can be injected into animals and reproduce the characteristic symptoms of the original disease and then, finally, and most important, can be isolated in its original form from the affected tissues of the animals experimentally inoculated.

NEW YORK NEUROLOGICAL SOCIETY.

Regular Meeting, March 1, 1904.

The President, Pearce Bailey, M.D., in the Chair.

A Case of Facial Hemiatrophy.—Dr. Pierce Clark, who presented this paper, said he was indebted to Dr. McEntee for the history of this case, and to Dr. Holding for the X-ray pictures. The details of the case were as follows: The patient was a man, sixty-two years old, married, and the father of two children. His occupation was that of a clerk. His family history was negative. The patient himself had never had any serious illness. As a boy of five or six years, he received a slight burn on the right side of the face, which, however, left no scar, and the occurrence of which slipped his memory during the first two or three examinations. Eighteen years ago, at the age of forty-four years, the patient noticed a slight muscular contraction in the right side of the neck under the jaw, similar to that which was now present in the masseter and temporal muscles. The muscular twitchings were probably in the digastric and pterygoids. Rubbing diminished the spasm for a time. There was no pain; only discomfort, to which he soon accustomed himself. After three or four years he noticed the twitching or fibrillations now present. The tremor ceased at times, but quickly returned on fatigue, exposure to cold, excitement, or any undue emotional stress. About six years ago he noticed the wasting in the right side of the face. Three years ago it became very marked, the teeth became decayed and loose and were easily removed by a dentist. Early last January he contracted right trigeminal neuralgia in all three distributions of the nerve, from which he was now slowly recovering. The physical examination showed that all the cranial nerves were free with the exception of the fifth. The sensory portion appeared intact, with the exception that differential smell and taste were a little slow on the right side, possibly due to the functional defect expressed in the neuralgia. The atrophy of the skin, subcutaneous fat and bone were sharply confined to the supposed distribution of the fifth nerve. There was no defect in the palate or tongue. There was no atrophy nor reaction of degeneration in the motor portion of the fifth nerve, the fibrillation being the only evidence of the involvement of the masseters and temporal. There was, however, a shortening of the masticatory muscle, which apparently restricted the separation of the jaws about one inch; this limitation was described in the absence of fibrillation so that he could do a little better than this, particularly in the morning, after a full night's rest. There were no lateral movements of the jaw, the pterygoids, apparently not functionating. The amount of asymmetry in this case was not so great as in those cases occurring in earlier life, where a hindrance of growth increased the effects of wasting. The atrophy had always been general, and not especially marked in any one spot, as in the facial hemiatrophies of sclerodermal origin or of the morpheal type. The hair and beard did not participate in the affection, although there was a rather marked thinning and whitening at the free border of the hair on the right side of the forehead. The lesion seemed to affect all divisions of the fifth nerve, and was not entirely confined to the right side.

Dr. William M. Leszynsky said that the patient had developed a trigeminal neuralgia on the affected side of the face. The speaker said he had seen several cases of facial tic where subsequently a trigeminal neuralgia developed on the same side.

Dr. Pearce Bailey called attention to the long duration of the hemiatrophy and said that the marked fibrillation was rather suggestive of the analogous condition observed in progressive muscular atrophy.

Dr. J. Ramsay Hunt said he did not see how Dr. Clark could exclude a slowly progressing lesion of the fifth nerve. A slowly growing tumor would account for the neuralgia, the hemiatrophy and fibrillation, and the muscular contractions in the masseter and temporal. The speaker said he thought the sensory symptoms excluded progressive muscular atrophy.

Dr. Clark, in closing, said the analogy between his case and one of progressive muscular atrophy did not go further than the fibrillation. There was no evidence of progressive loss of power in the masseter and temporal muscles. If the lesion suggested by Dr. Hunt was a tumor, it must be a very slowly progressing one, as the condition had existed for eighteen years. Possibly it had to do with the motor division of the nerve only. Slowly progressive alterations in the posterior root ganglions were very likely to be attended with trophic loss without changes in the pain or tactile sensations.

Dr. Clark also presented some X-ray photographs to illustrate an easy clinical method of demonstrating volumetric hypertrophy in bone, muscle and fat in parts which undergo true or false hypertrophy. It obviated the necessity of excising tissue, which was a painful and inaccurate means of determining these alterations, although the latter method must be resorted to in order to determine whether the muscular increase was due to hyperplasia or fiber hypertrophy. The photographs were of a case of hypertrophy of the leg of the paralyzed side of an infantile cerebral hemiplegia. The X-ray negatives were made by Dr. Holding.

A Case of Idiopathic Epilepsy in a Canary Bird.—This case was also reported by Dr. Pierce Clark. The bird was a male, one year old, from a brood of four. The family and personal history was negative. No cause for the epilepsy was known. Typical idiopathic *grand mal* of Jacksonian onset, and *petit mal* occurred irregularly every few days at the beginning of the observation period. After giving a detailed description of the attacks, Dr. Clark said the case was interesting because it showed (1) apparent idiopathic epilepsy in a bird. Nearly all previously reported cases of animal epilepsy, and especially in the bird, where an autopsy was made, proved to be Jacksonian traumatic epilepsies; (2) postepileptic exhaustion paralysis; (3) status epilepticus and death analogous in many clinical respects to that seen in the human.

A Case of Cerebral Tumor, with Specimen.—Dr. Clark reported this case, in order to show the absence of focalizing symptoms, particularly astereognosis, which one would expect to be present from the nature, size and position of the tumor. The history of the case was as follows: S. B., aged thirty-six years, a housewife, married two years. A native of Hungary. Her

family history was negative, and she had always enjoyed good health until eighteen months ago, when she began to complain of postoccipital paroxysmal headache, which was especially marked on the left side and extended down into the corresponding shoulder. Six months later the attacks of headache were accompanied by vomiting. On August 13, 1903, one year after the onset of her symptoms, an examination was made which showed that there was no cranial nerve involvement excepting the optic nerve, the power of which was impaired, and in November the patient became completely blind. There was no astereognosis in hand or foot. There were no focalizing symptoms excepting the persistent pain over the left parietal region, which was increased on pressure and accompanied by stiffening of the muscles on the left side of the neck. Inasmuch as the patient became delirious at times from the headache, and as the X-ray negative showed a light shadow approximately in the region of the pain and tenderness, it was decided to make an exploratory incision, which was done by Dr. Hartley, at the New York Hospital on January 20 last. There was considerable bulging in the trephine opening, but the operation failed to disclose the tumor. However, it relieved the patient of headache and all her distressing symptoms. The swelling disappeared from the optic disk and the nerve showed complete atrophy. Three weeks after the operation the patient disturbed the dressing, which she said irritated her scalp. In consequence of this the wound became inflamed, and death resulted on February 24. The autopsy was performed by Dr. Biggs, who found a tumor deeply imbedded in the posterosuperior part of the right parietal lobe. It was round and firm and attached to the neighboring portion of the falx. It was about 4½ cm. in diameter; anteriorly, its border corresponded to the termination of the collosomarginal fissure, and posteriorly it extended to within one centimeter of the parieto-occipital fissure. The probable diagnosis was an endothelioma of the dura.

A Case of Myasthenia Gravis Pseudoparalytica (?).—This was presented by Dr. B. Sachs. The patient was a man aged thirty-five years; a picture-framer by occupation. He had had typhoid fever in childhood, and when he was sixteen years old he had an attack of St. Vitus dance which lasted about four months and was very severe. Five years ago he had pneumonia. Between the ages of sixteen and thirty years he was, comparatively speaking, a well man. In April, 1902, he stated that his tongue felt very heavy; this lasted about six weeks and then passed off. On February 1, 1903, he received a glancing blow on the head with a sharp knife. The knife, which was about 40 inches long and weighed fully 75 pounds, was attached to a table above his head, and came down full force, although it only caused a slight wound which readily healed within a week. In September, 1903, his tongue again began to feel heavy and he became very nervous. At times he did not have the use of his tongue at all. The first examination of the patient made by Dr. Sachs revealed a peculiarity of speech, which was thick and distinctly bulbar in character. The head was inclined forward, and to the right side. He also complained of weakness in his hands, and said he could not do his work properly. Formerly, he had been able to cut through many thicknesses of cardboard easily, but now he did not have the power to draw the knife through. There were no signs of paralysis, but he did not have the grasp of an able-bodied man. He complained of becoming tired after slight exertion. At the time of the first examination, the knee-jerks were absent. Since December 5, 1903, when Dr. Sachs first saw him, there had been a distinct improvement in his speech and general condition. He complained that his vision was at times limited, so that he could not look up well. While using a knife or fork he occasionally halted in the movement for a moment, showing that the effort to use his muscles was at times ineffectual. Since the first examination the knee-jerks had returned and were normal. Another symptom of which he had complained was difficulty in swallowing; food would at times produce a choking sensation and there was occasional regurgitation. He had also complained of drooling. He never had any trouble in chewing his food. There was no fibrillary tremor of the tongue; electrical examinations were negative. Heart and lungs and other organs were apparently normal. The reflexes were not increased. There was no atrophy anywhere, either in the shoulders or upper or lower extremities. Dr. Sachs said he had examined this patient frequently, and the case had puzzled him greatly. The diagnosis had been still further obscured by the fact that the patient had been thoroughly mercurialized, and his gums had become affected. This was also the cause of the drooling. Among the conditions considered were a recurrence of the chorea, with thickness of speech, and amyotrophic lateral sclerosis, but the symptoms did not warrant either diagnosis. There was nothing to indicate the bulbar form of muscular atrophy, and Dr. Sachs said he finally came to the conclusion that the case represented an atypical form of myasthenia gravis pseudoparalytica.

Dr. Bailey said that in the cases of myasthenia gravis he had seen the muscles become easily fatigued. This applied not only to the voluntary muscles, but to the reflexes.

Dr. Hunt said the symptoms in the early stage of the case, as his diplopia, paresthesia of the tongue and absent knee-jerks were rather suggestive of tabes. Dr. Spiller, of Philadelphia, had reported such a case of bulbar tabes about a year ago, in which there was difficulty in deglutition and articulation. The improvement in the symptoms may have been due to the mercurialization; such retrogression in the earlier stage was not uncommon.

Dr. Sachs said that when he first saw the case he was inclined to regard it as an example of the bulbar form of tabes, but he had since been compelled to abandon that diagnosis. The knee-jerks, which were at first absent, had returned. There had never been any lightning pains nor eye-symptoms, nor other evidences of tabes.

A Case of Multiple Neuritis.—This case was presented by Dr. Isador Abrahamson. The patient was a woman, who was born in Germany thirty-four years ago. With the exception of an attack of pleurisy three years ago, her personal history was negative. Her present illness dated back to February, 1903, when she noticed some weakness in the legs, especially the right one. In March she had an attack of cough, with expectoration and pain, especially over the left shoulder-blade, and her attending physician told her she had a recurrence of her pleurisy. Three or four weeks later she had an attack of vomiting and diarrhea, with edema of the face and all four extremities; the latter symptoms were not marked; there was some fever. The urine was negative. A "leaky heart" was diagnosed by her physician. She now began to complain of pain chiefly at night; it was boring in character, involving the outer sides of both legs. There were no local signs excepting tenderness on pressure along the outer surface of the legs. The pains and weakness in the legs progressed, and four weeks later she began to complain of numbness in the hands, especially the right, with beginning weakness on the thumb side more than on the ulnar. There was noticeable wasting in the legs, chiefly on their outer surfaces, and paresthesia in the region of the thighs, legs

and feet. During all this time the patient remained in bed, suffering from frequent urination and diarrhea. Her fever lasted about two weeks. The diagnosis made at this time was influenza. Upon attempting to leave her bed, she found that she was unable to walk. Dropped feet were apparent, and to a lesser extent dropped wrist. The physicians in attendance called the condition neuritis and partial muscular paralysis. According to their statement, no sensory disturbances were present. The patient stated that she felt at all times the slightest touch, and that she was able to distinguish pin-pricks and hot and cold applications. She felt acutely the application of the faradic current. She was seen by Dr. Rieser on October 1, 1903, who found no sensory disturbances, although multiple neuritis of influenzal origin was diagnosed. The case was referred to Dr. Abrahamson on October 26, 1903. At that time some improvement had already taken place. There was marked motor weakness in both forearms and hands, and some wasting of the right thenar eminence. There was partial dropped wrists on both sides. The deep reflexes were absent; there was some ataxia, chiefly on the right side. The greatest weakness was in the extensors of the forearm; in the flexors of the hand and in the pronators and supinators. No sensory disturbances could be elicited. The heart was apparently normal and the trunk muscles intact. The abdominal reflexes were present.

There was a distinct dropped foot, and the patient walked very unsteadily. There was some wasting of the peronei muscles. There were no fibrillary twitchings. The knee-jerks and Achilles reflex were absent on both sides. The feet were cold and somewhat congested. There was tenderness along the perineal nerve; less along the posterior surface. Decided reaction of degeneration in peroneals. With the exception of slight tactile uncertainty, occurring only at times and not at all constant, there were no changes in tactile, pain or temperature sensations. The patient was treated with electricity and strychnine and improved rapidly. She was now able to walk alone, although there was still some peroneal weakness. In view of the history of edema, diarrhea and vomiting, the distinctly peripheral character of the paralysis, the paresthesia, pain, nerve tenderness, etc., and the rather slow but progressive character of the onset left little doubt as to the diagnosis, in spite of the absence of objective sensory symptoms. Landry's paralysis, the speaker thought, could be excluded, though there were many points of resemblance. The etiology of the multiple neuritis, upon careful examination and questioning, negatived any metallic poisoning, and influenza had to be assumed as the etiologic factor. A few similar cases had been reported by Blocq and others.

Dr. Sachs said if there was one fact that had been learned about multiple neuritis, it was that for some reason which it was difficult to explain sensory symptoms were almost invariably less prominent than the motor. He considered the motor form of multiple neuritis infinitely more common than the sensory. In the earlier stages of the disease there was usually some sensitiveness to pressure over the nerve, but actual objective sensory symptoms were frequently absent in the most pronounced and indubitable cases of multiple neuritis.

Dr. Leszynsky said he agreed entirely with Dr. Sachs. In several cases of multiple neuritis, however, he had observed slight sensory disturbances in the early stages, which disappeared within a few weeks. In the later stages of the disease he found no sensory symptoms whatever.

Dr. Clark said he had seen a number of Barnes' cases in London, and listened to a discussion upon them. They distinctly represented a form of polyneuritis, involving the motor fibers of the nerve almost exclusively. In the course of the discussion, one of the speakers said he doubted whether there were any cases of purely sensory neuritis.

Dr. Abrahamson, in closing, said this was the only case of multiple neuritis he had seen that had not shown at any stage the least objective disturbance of sensibility.

A Case of Recurrent Peripheral Facial Paralysis.—This case was also presented by Dr. Abrahamson. The patient was a man, thirty-two years old, a hatmaker by occupation. His family history was negative. Six months ago a physician who examined him for a lodge found albumin in the urine. Denies syphilis. He used alcohol and tobacco in moderation. He stated that in the preparation of the felt for hats, mercury and probably arsenic was used for shrinking purposes, and that many of his fellow-workmen exhibited tremor and salivation. Personally, he had never shown any symptoms of mercurial poisoning. The patient's symptoms were those of peripheral facial palsy, of which this was his fourth attack. His first attack was on the right side, and occurred sixteen years ago, all three branches of the nerve being involved. The attack lasted three or four months. His hearing remained normal; there was no otitis. The attack was attributed to exposure. He made a complete recovery; there were no sensory symptoms. His second attack occurred four years later. It was on the left side and all three branches of the nerve were involved. It lasted about the same length of time as the first. There was no otitis; no sensory symptoms. Recovery was complete. The third attack was also on the left side, and occurred seven years ago. All three branches of the nerve were involved. There were no aural symptoms. The attack lasted four months; recovery was complete. His present attack dated back to February 3, 1904. It began with pains radiating from the left aural region to the left lower face, and was followed by paralysis of all three branches of the left facial nerve. Hearing was not impaired; there were no evidences of any otitis. The patient also complained of some weakness and a cramp-like feeling in the left hand, especially when grasping objects. There was no headache, vertigo nor vomiting. His mentality was not impaired. There was no difficulty in swallowing, speaking, etc. Micturition and defecation were normal. He had never had diplopia. Examination revealed a paralysis of all three branches of the facial nerve. The tongue was drawn slightly to the right; the uvula markedly so. Taste was impaired over the left half of the tongue. Hearing was not impaired. The ocular movements and superficial reflexes were normal. There was no ataxia. No evidence of lues. The sensibility, especially to temperature, was markedly diminished over the left half of the body, excluding the genitalia.

Dr. Abrahamson said the case was particularly interesting on account of the multiplicity of the attacks. As to the cause of the attacks, syphilis was apparently negatived by the absence of any history or findings indicating that disease, the vague nature of the ophthalmoscopic findings (which upon second examination were negative), the completeness of the facial palsy each time, the absence of involvement of any other cranial nerves, and the completeness of recovery without specific treatment. As to the cause of the attacks, mercury, with or without arsenic, was possibly the true etiological factor. The associated hemianesthesia was no doubt of a hysterical nature.

Nervous Symptoms in Three Patients with Azoturia.—Dr. William H. Thomson read a paper on this subject, in which he stated that it was his routine practice with all patients who consulted him for nervous

ailments to have frequent examinations made of the urine for the purpose of determining the daily output of its *normal* ingredients. Repeatedly, in many cases of so-called neurasthenia, the reports would show that the excretion of urea would be only from one-fourth to one-half of what it ought to be, with sometimes a corresponding diminution of the other solids of the urine, and sometimes not, but rather an excess of the other saline ingredients, with a marked diminution of urea. Occasionally, however, he has had patients narrate a series of symptoms resembling in many particulars those showing deficiency of elimination, but on examination they proved to have a marked excess of both urea and solids amounting in one case to ten times the quantity of urea of another patient who clinically might have been classed with him as a typical neurasthenic. To illustrate this condition, Dr. Thomson briefly reported three such cases coming under his observation. In all three of these cases, pain in the eyes, especially from reading, was a leading symptom. What connection there could be between their ocular troubles and the marked excess in the excretion of urea and of other solids he could not say, and he was inclined to look upon their occurrence as accidental. His own view about the nature of these cases was that they were related to diabetes mellitus, and he would term them urea diabetes in distinction from saccharine diabetes. He did not venture to guess what the underlying cause of this particular form of systemic waste could be, but following his hypothesis, he laid down for these patients the same line of treatment which he would for a diabetic. His notes showed that these patients could not digest starches, and for that reason he largely excluded farinaceous articles from their diet and then prescribed the antiseptics which he had treated of more fully in a recently published paper on the Medical Treatment of Diabetics. Dr. Thomson said that in none of his three cases were the patients large meat eaters. The first patient said she could not eat meat with any comfort, and rarely touched it. The second patient said she had given up beef and mutton some years ago because it usually gave her a headache. The third patient was almost an anchorite and was practically starving himself, as he believed that his stomach was the cause of all his troubles.

WILLS' HOSPITAL OPHTHALMIC SOCIETY.

Stated Meeting, held March 14, 1904.

The Chairman, William Zentmayer, M.D., in the Chair.

DISCUSSION UPON GLAUCOMA.

Glaucoma.—Dr. Frank Fisher, in order to open the subject, cited the histories of two diametrically opposed types of such cases which had recently come under his observation. He desired to know under what conditions an iridectomy should be performed; when should enucleation of a glaucomatous blind eye be done; and if enucleation be done, what effect would the procedure have upon the fellow eye. He was uncertain as to the character of the visual fields serving as a guide to the value of an iridectomy, they being so unstable and uncertain. His experience had led him to ignore the usefulness of the degree or the grade of visual acuity as offering itself as a therapeutic guide. In some eyes which had become blinded from glaucoma processes, he had found that eserine failed to produce pupillary contraction. He had been interested in studying a series of cases of glaucoma, in which there had not been any consanguineous marriages: he gave the detailed history of one such family, and had more or less knowledge of some others. He inquired what had been the experience of members of the society in regard to the ophthalmoscopic appearances of the eyeground and media after the performance of posterior sclerotomy. He asked this question as he had seen two cases in which he could locate the position of the internal traumatism by a localized rupture of the chorioid. He would like to know the most tenable theory for the more or less reduction of intraocular tension in cases in which posterior sclerotomy had been done. He asked the question whether the vitreous elements were reformed or not. He would like to know if any members of the society had, like himself, seen recession of optic nerve head cupping after successful iridectomy.

Enucleation and Iridectomy.—The chairman stated that he enucleated the offending eye in absolute glaucoma, with a possible previous attempt at iridectomy. He performed an iridectomy, if possible, in acute inflammatory glaucoma. His studies with the visual fields in chronic glaucoma had taught him that the character of decreases and the peculiarities of lessened areas were not in any way characteristic or typical.

Remedial Measures.—Dr. Conrad Berens believed that enucleation tended toward the conservation of the energies of the other eye; his experience being that vision and intraocular tension of the remaining eye are preserved for much longer periods of time. His experience had taught him that the earlier an enucleation is done—particularly in a painful eye—the safer it is for the other one. If possible, he preferred an early iridectomy in all appropriate cases. In some cases of systemic type he eschewed all forms of operative procedure and preferred to wait for some acute condition necessitating radical measures, watching and guarding over the general system, and directing his main therapy toward the general dyscrasia at hand. He had found good results from the ingestion of large doses of iodide of potassium in association with the salicylates. He had found that the more he had to deal with the condition, the more he depended upon remedial measures, reserving, as a rule, operative interference for cases of the fulminating type. He had observed the effects of climate upon such cases, and spoke of the effects of psychological processes upon the condition of the patient. He mentioned his experiences with the results that he had obtained in some of his chronic cases by the employment of varying strengths of synoidal currents.

Dr. McCluney Radcliffe showed a case under his care in the hospital in which by enucleation of the blind eye, in combination with appropriate local and general treatment, the ordinarily seen progressive and disastrous symptoms, he felt sure, were rapidly and painlessly disappearing in the fellow eye.

Removal of the Crystalline Lens.—Dr. Charles A. Oliver said that no fast and hard law could be laid down in any particular case. Each one, and even the same case at different times, demanding what might be aptly termed "symptomatic treatment." After a large experience with various operative measures, in association with carefully graded local and general therapy, and above all, hygiene with well-regulated cheerful surroundings, and early treatment directed toward the removal of any possible offending dyscrasia, he had in many cases, ceased to be disturbed as to the probability of ultimate failure; in other words, he made it an unalterable rule to exercise constant vigilance against the general and special inroads of any causative factor with the prompt removal of the disturbing local conditions in the easiest and the most conformable way possible in each case. Whenever possible, he enucleated an eye which had become blinded from glaucoma, as he had learned from experience that it was the safest and the most certain of all of the radical procedures

in certain types of cases for the good of the fellow eye; in fact, he was certain that it undoubtedly seemed to have a beneficial influence upon the fellow organ, whether it was injured or not. The question of the performance of an iridectomy he reserved to cases in all stages, more particularly the incipient and practically unadvanced ones in which he felt that there was either a present necessity or an advantage in the future to be gained by opening as much as possible of an imperfectly acting filtration angle. In some cases of coarse severity, he repeated the iridectomy and even had successfully and usefully removed the crystalline lens. He uniformly reserved his operative procedures to the individual organ in question. He spoke of having seen some cases in the hands of some of his colleagues apparently do well by the employment of cyclotomy, and believed that the measure, if not too disturbing in its immediate traumatism, possibly did good by destruction of some of the lymph making glands. He asserted his disbelief in a proper regeneration of the vitreal elements, believing the vitreous to be like the crystalline lens, an organized body, which once removed or destroyed, was replaced with ordinary lymph: in consequence, he doubted the efficacy of all procedures in which loss of the vitreous body constituted a part. He denounced the term "liquid or fluid vitreous," and said that the replacement of the vitreous humor by ordinary lymph in which there were loose vitreal elements with uveal débris merely tended to provoke glandular action with consequent increase of the intraocular fluids. He spoke of the classical experiments of Uribe Troncoso upon the effects of altitude upon the density of the intraocular fluids, as well as the morphological conditions of the fluids themselves. As one of the results of a return of intraocular pressure to normal, he had more than once seen temporary lessening and even disappearance of shallow pathological cuppings in the optic nerve head, particularly in the temporally placed finer fibers.

Posterior Sclerotomy.—Dr. S. Lewis Ziegler spoke of the advantages and the good results he had personally obtained in certain varieties of cases by the performance of posterior sclerotomy. He made the procedure by a quick plunge with a von Graefe knife with its back directed toward the ciliary body some six or eight millimeters back of the ciliary region, between the muscular attachments, and parallel with the radiating vessels. He rotated the knife at right angles to the first incision, allowed a few beads of vitreous to escape, and withdrew the instrument, thus making a T incision. He had found that there is immediate hypotension and there is never any reaction. His experiences had coincided closely with those given by Dr. Oliver. In the blind eyes of some such types he had had useful recourse to opticociliary neurotomy, having, he remembers in more than one instance, kept a functionless eyeball intact and free from pain and harmful influences for a period of nine years. He mentioned several interesting examples of the various conditions, showing the multiplicity and variability of the symptom-complex in cases which had come under his immediate observation; distinctly proving the efficacy of certain procedures in some cases, and the inefficiencies of many authoritative measures that had been strictly applied, in others. The more extended his experience had become in such an enormous mass of material as was almost daily given him in such a large service as in the outpatient department of the hospital, the broader and the more conservative had become his views in regard to therapeutic measures. He was daily waiting for opportunity, and was more than willing to apply any plan of therapy which offered in the least a greater chance for the patient's welfare. Upon being asked whether he would do an iridectomy at the time of the appearance of the earliest signs and symptoms of the disease, he answered that he would in appropriate cases. He had never had any intraocular complications of inflammatory type to arise after the performance of posterior sclerotomy. In a number of painful cases in which immediate operative procedure could not be done, he had most useful recourse to a formula containing hyoscine, hydrobromate, morphine, strychnine, and pilocarpine; a combination which not only subdued pain, but which both stimulated and controlled lymph circulation. In support of his claim for the value of these therapeutic agents, he cited three most interesting confirmative cases which he had seen at the hospital several years previously. In the use of electricity he had had considerable experience, finding a most curious paradoxical result that pain and tension are reduced when the negative electrode is applied to the eyeball. In his hands, pneumo-massage had given but moderate effects in some cases of chronic glaucoma.

NORTH BRANCH PHILADELPHIA COUNTY MEDICAL SOCIETY.

Stated Meeting, held Thursday, April 14, 1904.

The President, Samuel Wolfe, M.D., in the Chair.

Some Reflex Conditions Caused by Foreign Bodies in the Intestinal Tract.—Dr. Anna M. Reynolds read this paper. The first case was that of an infant six months old, taken suddenly ill in the morning with diarrhea followed by vomiting, which was diagnosed on the fourth day as caused by the uterus pressing on the bowel. The next day several hard convulsions occurred resulting fatally and the condition was found to be impaction of the bowel. The second case was a female, aged fifty-two years, who began with convulsions when a baby, two years later developing epilepsy, for which she was treated by a German doctor by means of large doses of calomel and castor oil and for about twelve years filled a responsible position. Another case which was diagnosed as extrauterine pregnancy proved to be a mass of blackberry seeds. The fourth patient was a male infant who began with bilious attacks, which increased in frequency and finally he lost consciousness; the case was diagnosed as epilepsy. Upon the administration of half a grain of calomel every hour for six doses followed by castor oil, a brass button with a shank was passed, which he had lost off his coat and the convulsions ceased. The fifth patient was subject to constipation and dizzy spells and one morning had two in succession. Calomel and castor oil and liquor potassium arsenitis were administered and in two years there has been no return of the symptoms. The sixth case was that of a young man who had convulsions at the age of three years and at twenty-four developed epilepsy. He was treated by the bromides with no success, after which he went to the country and gave careful attention to his diet and bowels, and has had only two very light seizures in four months.

Dr. Boardman Reed believed that there were a great many more conditions resulting from reflex symptoms of the intestinal tract than is usually recognized, not only epilepsy, but also headaches, nervousness, etc., and that even true epilepsy was much aggravated by disturbance therein, and recommended thorough daily evacuation of the bowels.

Dr. William H. Good referred to the case of a woman who was troubled with hoarseness which disappeared after the expulsion of a large amount of worms.

Dr. Mordecai Price referred to a case of epilepsy

which had been under his care for a year, in which the bromide treatment had been of no avail; upon cessation of the treatment the symptoms cleared up.

Dr. Frank White referred to two cases as illustrating the tolerance of the intestinal tract without producing reflex symptoms in some cases. In the first, a foreign body, 5½ inches long by 1½ inches in thickness and weighing 4½ ounces was removed from the stomach of an idiotic boy at autopsy; and in the other case about 15 whole shellbarks and about half as many in pieces were removed from a boy's rectum. In neither case were there any reflex symptoms.

The Surgical Treatment of Abortion.—Dr. Frank C. Hammond read this paper. He stated that it was always desirable to ascertain when threatened abortion becomes inevitable, as the treatment will be thereby radically altered. He called attention to the fact that hemorrhage more or less persistent might exist, even during the entire period of pregnancy, without producing an abortion. He cited the cases observed by Playfair, Charpentier, Doloris and others, in which pieces of decidua were expelled without the interruption of pregnancy. When the abortion is inevitable, the chief dangers are from hemorrhage and septicemia, either general or a local infection. Tetanus occasionally follows abortion. Suspicion should always be directed to every case resembling acute articular rheumatism, following a recent abortion, as it is much more likely to be suppurative arthritis, which should be treated by free incision and drainage, strict antisepsis being observed. The remote dangers from abortion are inflammatory disease of the uterus and adnexa, with the resultant train of pelvic and reflex symptoms. He reported a case in which two Italian physicians had diagnosed malignant uterine disease in a woman of fifty years, in which curettage, and packing with iodoform gauze, proved the case to be one of incomplete abortion with retained putrefactive débris. The author believed that if every case of inevitable abortion was submitted to an antiseptic curettage properly done, the mortality would be nil, excepting criminal abortions. He believed that the expectant plan of treatment will produce the best results in the hands of the general practitioner, so long as fever, excessive hemorrhage and putrefaction are absent; any retained débris should be removed, for, even though it does not produce fever or sloughing, it may cause inflammatory disease of the pelvic organs and invalidism. The author referred to a case which he operated upon for bilateral laceration of the cervix and lacerated pelvic floor, no disease of the adnexa, in which the uterus was literally filled with débris, the woman admitting to over 20 self-induced abortions. When abortion is inevitable, the uterus should be at once thoroughly emptied under anesthesia. The treatment of sapremia following abortion should be by emptying the uterus and thorough disinfection of the genital tract with intrauterine douches of formalin 1.1,500; or sublimate solution 1.3,000 or 4,000, followed by normal salt solution, to avoid the danger of mercuric poisoning. The treatment of septicemia depends upon the character of the infection and may be either by measures tending to neutralize the bacteria, or surgical by the evacuation of pus or the removal of the diseased organs. Difficulty of differential diagnosis is experienced when typhoid makes its first appearance at childbirth. Intravenous injections of normal salt solution, quinine, strychnine, digitalis and atropine, as indications arise; and careful regulation of the diet should be enforced, and in severe cases collapse may be overcome by ammonium carbonate per rectum and nitroglycerin hypodermatically. The treatment of septicemia due to streptococci should be by means of antiseptic uterine douches and drainage by loosely packed iodoform gauze; curettage should not be employed owing to its likelihood of spreading the germs and the production of general infection in an already localized case. Pryor advocates the isolation of the infected uterus between masses of iodoform gauze and local and systemic iodism, to destroy the cocci, locally and systemically. Pus tubes and ovarian abscesses should be removed, either per vagina, or by abdominal incision, depending upon the accessibility of the lesion and the condition of the patient.

Etiology and Medical Treatment of Abortion was considered by Dr. I. P. Strittmatter, who stated that the most frequent causes of abortion in his experience had been as follows: (1) Prior criminal abortion; (2) syphilis; (3) pyosalpinx; (4) backward displacement of the uterus. In the first class of cases, careful curettage and packing and general tonic treatment; in the second class of cases, administration of the iodides and general antisyphilitic treatment, and in the fourth class suitable operation had given the best results. In those cases in which there is a relaxed condition of the muscles and joints, with frequent attacks of rheumatism and sometimes attended by heart lesions, antirheumatic treatment should be instituted.

Medicolegal Aspects of Criminal Abortion.—This paper was read by Thomas W. Barlow, Esq., of the Philadelphia Bar, in which he referred to a paper written by Dr. Andrew Nevinger in 1870, who was then President of the Philadelphia County Medical Society, in which he urged upon the clergymen to exercise their influence with the women of the church in reference to the crime of abortion and calling their attention to the consequences of it; and urging the passing of a law prohibiting it. He referred to the difference in the laws of various States on this subject, and called attention to the fact that the law of Pennsylvania applies to an abortion committed at any time during pregnancy, while in other States it must be done when the woman is "quick" with child. He believed that the laws of Pennsylvania were quite sufficient in this respect and that if the crime was increasing it was due to the non-execution thereof by those on whom the obligation rests. He referred to the function of the police department, detective department, magistrates, coroner, district attorney and courts in the prosecution of such crime, and stated that it was impossible that all should be accomplished by the police power, and suggested that the work against the professional abortionist rests entirely within the medical profession itself. He recommended that a committee be appointed to take charge of the matter, which he believed would have a deterrent effect upon such lawbreakers.

Dr. Richard C. Norris, in the discussion, stated that while he appreciated the sentiment that prompted Mr. Barlow's suggestions, he felt that there were certain practical difficulties in the way, the chief of which was the confidential relation that existed between physician and patient, which deters the physician from reporting the case to the authorities, particularly, as is frequently the case, when a physician is called in after an abortion has been committed one or both of the parties are of high social standing. Another difficulty is the shrewdness with which the abortionists do their work, making it almost impossible to secure legal evidence against them. Many of them even subject their patients to an oath, who in numerous cases, even with a knowledge of impending death will not reveal the author of the crime, owing to the sanctity of the oath. He believes that the appointment of a committee might have a deterrent effect upon a certain class but that the most good could be accomplished by the medical profession by

teaching their patients the moral wrong and great danger of the procedure.

Dr. A. M. Eaton urged that the physician impress upon any patient who should request him to perform an abortion the moral turpitude of the crime, and referred to three cases, in which the women had desired to have act committed, who had been deterred therefrom by his suggestion to go to a secluded part of the city until after the birth of the child. He referred to the case of a barber who stated that he had performed over 250 abortions without any fatalities by taking a soft catheter, inserting it in the womb and injecting milk and carbolic acid "until something gave way."

Dr. Mordecai Price stated that he never treated a case of abortion until he was informed who had performed the operation, which course he deemed necessary for the safety of the attending physician. In any case in which the fetus is dead, he believed that it should be removed at once, and when either the membranes or the fetus are discovered to be coming away, the uterus should at once be emptied, with the hand, the curette being used only in cases of necessity. He did not sanction irrigation of the uterus with any fluid and particularly deprecated bichloride of mercury douche.

Dr. A. C. Morgan referred to a case which had come under his notice in which the girl was of very high standing socially, and in which he felt that his professional relation would have prevented him from giving evidence to convict the abortionist, and this, he agreed with Dr. Norris, was the practical difficulty in the way of the conviction of these men.

Dr. W. E. Parke raised the question as to whether the physician should report a case when he is called in or should the whole thing be kept quiet. He referred to a case which he had seen, in which there had been bleeding and straining for twenty-four hours, and although the patient absolutely denied any action to induce abortion, it was evident that such was going on. No urine had been passed since the beginning of the attack, and catheterization yielded about a dram of almost pure blood, which could not be accounted for. A few hours later the uterus was cleaned out and three hours thereafter catheterization yielded about a dram of a slightly less bloody fluid. The next morning it was discovered that there was an opening from the bladder into the genital tract. The patient apparently improved; the temperature became normal and the pulse nearly so for about two weeks, when she was taken suddenly worse and died. The conclusion was reached that the fistula in the genital tract was produced by pushing something into the bladder through the vagina or cervix, in an attempt to produce an abortion.

Dr. Henry S. Cattell recommended that a black list be kept by a Committee of the County Medical Society of all the physicians and others who are suspected of doing this work, which should only be accessible to such committee, and believed that many physicians would give information to such a committee, with the understanding that it would not be given publicity, that they would not give otherwise. He stated that he made attempts by communicating with the post-office authorities at Washington to have the mail of certain of such practitioners withheld, but had been informed that there was not sufficient evidence to warrant this course.

The papers were also discussed by Dr. Anna M. Reynolds and Dr. Hammond, who, in closing, felt that the untoward effects produced by the use of the curette were rather the fault of the operator than the instrument. He stated that he could see no reason for objecting to free irrigation of the uterus, as any infected wound should be treated by irrigation and drainage; if bichloride of mercury douche is used it should be followed up by normal salt solution in order to prevent mercurial poisoning.

Thomas W. Barlow, Esq., in closing, urged upon the audience their duty to report every case of crime of which they had knowledge, but whether the relations with the patient were such as to deter such action he felt must be decided by the physician in the individual case. He also dwelt upon the importance of the coroner's office and the necessity for the continuance thereof.

BOOK REVIEWS.

ARMY INEFFICIENCY, its Greatest Cause. By A. C. PROFEIT, M.B., Lond. J. & A. Churchill, London. P. Blakiston's Son & Co., Philadelphia.

THE preface of this little book states that the greatest of all causes of army inefficiency is the excessive prevalence of venereal diseases. It continues: "It is idle to expect efficiency until some steps are taken for their prevention." The author discusses the condition of affairs with regard to venereal disease in the British army in the various parts of the world and the history of the Contagious Diseases Act which was meant to prevent them, did actually accomplish good, but has been repealed. The book is all the more interesting, now that in this country we are in a position in which we are compelled to maintain military forces larger than before, and in various parts of the world.

THE AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY FOR 1904. Under the editorial charge of GEORGE M. GOULD, A.M., M.D. In two volumes. Volume I, including *General Medicine*. Octavo, 673 pages, fully illustrated. W. B. Saunders & Co., Philadelphia, New York, London.

IT is an axiom that every practitioner of medicine should attempt to keep abreast of the progress of his science. Doubtless the great majority of them realize this fact, some more acutely than others. Yet the activity of research in every branch of the art is so remarkable, and the volume of publication so enormous, that the task becomes a practical impossibility, if it is attempted at first hand. It is to the various compends, "Centralblätter," and so forth, that the practitioner must look for a summary and criticism of what is new, and what claims to be good. Saunders' Series of American Year-Books have long been known as one of the best types of this class of literature, and, under the general editorial supervision of Dr. George M. Gould have achieved an excellent reputation for thoroughness and good judgment. The Year-book of Medicine for 1904 is no exception to the rule set by its predecessors. The subject has been divided into ten sections, which include not only the branches of general medicine, but also pathology, hygiene, chemistry, legal medicine and materia medica. The general plan of summarizing the more important literature of the year, both American and foreign, has been adhered to, and these briefs are in most cases illuminated by critical remarks by the editors. Fair-mindedness and a certain breadth of view are, therefore, essentials in the make-up of a work of such a nature, since the bias of the reader is largely determined by the editor. It is a pleasure to find that these qualities are nowhere lacking in the book, and one may accept the obiter dicta of the editors in most cases as very sane and conservative criticisms. The general make-up of the book in technical respects is excellent, and the index is ample.